

National Park Service
U.S. Department of the Interior

Santa Monica Mountains National Recreation Area
California



General Management Plan Environmental Impact Statement

Volume 1 of 2

Final
GENERAL MANAGEMENT PLAN
&
ENVIRONMENTAL
IMPACT
STATEMENT
VOLUME 1 OF 2

Santa Monica Mountains National Recreation Area
~ *California* ~



JULY, 2002

Final General Management Plan & Environmental Impact Statement
SANTA MONICA MOUNTAINS NATIONAL RECREATION AREA
Los Angeles and Ventura Counties, California

This *General Management Plan / Environmental Impact Statement* describes and analyzes five alternatives for managing Santa Monica Mountains National Recreation Area. The approved plan will provide a framework for managing development, visitation, and natural and cultural resources for the next 15 to 20 years. Some issues to be addressed include impacts to natural and cultural resources caused by development, growing visitation and demand for outdoor recreation, lack of public transportation to and within the national recreation area, and increasing awareness about the national recreation area among residents of the metropolitan Los Angeles area.

The **no action alternative** provides a baseline for evaluating the environmental effects of the other alternatives. Current management practices would continue unchanged. Park managers would provide for visitor use and respond to natural and cultural resource management concerns according to current policy and legal requirements as funding allowed. About 30 percent of parkland would be designated low intensity. The **preferred alternative** incorporates the exceptional elements of the following three alternatives. Significant natural and cultural resources would be protected while providing compatible recreation and educational programs to a diverse public. About 80 percent of parkland would be designated low intensity. A Trail Management Plan would be prepared to address development and management of the trail system. Small pockets of concentrated high intensity activities would be located in nonsensitive or previously developed areas. Emphasis in the **preservation alternative** would be on preserving natural and cultural systems. About 80 percent of parkland would be designated low intensity. Some park-related development would be removed in sensitive areas. More educational exhibits would provide people with information about natural and cultural resources. Visitors would have the opportunity to visit, explore, and learn about the park through a variety of virtual “visitor centers” and informational Web sites. These alternative experiences would preserve resources by increasing appreciation and understanding. The emphasis in the **education alternative** would be on developing stronger environmental and cultural education programs. The NPS would work with local school districts and other education partners to deliver an outdoor experience to every child in Los Angeles. About 80 percent of parkland would be designated low intensity. All proposed facilities would have a strong educational emphasis. Overnight educational camps would be available to groups. People would understand and value the ecosystem through interactive educational programs using cutting-edge technology. In the **recreation alternative** the emphasis would be on maximizing recreation with new park development concentrated in nonsensitive or previously disturbed areas. A broader dispersion of outdoor recreational facilities would be provided without jeopardizing the long-term preservation of natural and cultural resources. About 65 percent of the park would be designated as moderate intensity. Facilities would be improved and/or expanded to accommodate growing demand, and existing wilderness areas would be protected.

Due to the general nature of the analysis presented, the types of environmental impacts for each of the five alternatives is fairly similar. They differ in the intensity and location of visitor uses relative to sensitive resources and required level of park management. The recreation alternative has the highest number of facility developments; however, most of these facilities are located in high-use areas and away from sensitive resources.

The public review period on the *Draft Environmental Impact Statement* ended May 31, 2001. This final document includes the results of the public comment on the draft document. The no-action period on this final plan and environmental impact statement will end 30 days after the Environmental Protection Agency has accepted the document and published a notice of availability in the *Federal Register*. For further information, write to Superintendent, Santa Monica Mountains National Recreation Area, 401 Hillcrest Drive, Thousand Oaks, CA 91360, telephone 805-370-2300, or e-mail www.nps.gov/samo.

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A f f e c t e d E n v i r o n m e n t



*Each alternative
has been examined
for its potential
impact on
the environment.*



AFFECTED ENVIRONMENT

Impact Topics - Natural Resources

Air Quality

The Santa Monica Mountains National Recreation Area, like most of coastal southern California, has a Mediterranean-type climate. Mediterranean climates are characterized by mild, wet winters and hot, dry summers. Mediterranean climates occur in only five locations throughout the world including the U.S., along the Mediterranean Sea, in central Chile, southern/southwestern Australia, and in South Africa. In fact, the dominant vegetation type in all of these places is also similar in appearance, though unrelated; the scrubby brush is called “chaparral” in California, “maquis” in Portugal, “matorral” in Chile, “heath” in southwestern Australia and “fynbos” in South Africa.

In southern California, January and February are typically the coolest and wettest months and August and September are the hottest. Rainy seasons generally extend from November through May, with dry summers. Overall rainfall varies greatly within and around the Santa Monica Mountains. While mean annual precipitation in Los Angeles is 15.01 inches per year (Civic Center 1877–1987), it can be as much as 30 inches near the crest of the Santa Monica Mountains. Precipitation is also highly variable from year to year. Extended droughts lasting several years punctuated by moderate to extremely wet years are not uncommon.

Wind speeds vary in intensity and duration throughout the year within and adjacent to the Santa Monica Mountains. During summer days airflow is generally directed inland from the west, southwest, south and southeast. At night, airflow patterns reverse and travel toward the ocean. In the fall, and winter, especially, Santa Ana climactic conditions form and there is a pronounced airflow from the northeast down slopes and canyons toward the ocean. Since Santa Ana winds can gust up to 120 miles an hour, some of the most disastrous fires occur during Santa Ana wind conditions in the fall, when the air is dry and the fuel moisture low.



During the summer, another phenomenon known locally as the “marine layer” may decrease visibility throughout the day. Coastal fog is common during the morning hours, but dissipates by early afternoon. Early in the morning inland valleys may be fog-shrouded, but as temperatures increase, the fog dissipates until it crests the mountains and is vaporized or pushed out to sea. This wet “marine layer” or haze of water droplets is often also mistakenly referred to as smog.

Congress recognized the significance of the Santa Monica Mountains, situated between the highly developed Los Angeles Basin, the San Fernando Valley, and the Oxnard Plain, in the recreation area’s enabling legislation. Public law 95-625 specified that “...the Secretary shall manage the Recreation Area in a manner which will preserve and enhance ...its public value as an air shed for the southern California metropolitan area.” Since the 1940s, air quality measurements taken adjacent to the Santa Monica Mountains in urban Los Angeles have been among the worst in the United States.

The South Coast is in extreme nonattainment for ozone, serious nonattainment for carbon monoxide, and serious nonattainment for small particulate matter under 10 microns (PM₁₀). The South Coast Air Quality Management District (SCAQMD) functions as the oversight organization for monitoring air quality and compliance with standards.

Atmospheric circulation patterns influence the intensity of smog in southern California. The development of especially strong temperature inversions, which inhibit vertical air mixing, occurs especially during the summer months. In the presence of temperature inversions, visibility is greatly decreased and pollutants are trapped close to the ground in the basins of the Los Angeles metropolitan area. Lower air quality occurs during the summer due to the combination

of persistent, strong inversion layers with intense solar radiation, which increase the photochemical reactions that contribute to the amount of ozone produced. During the winter, lower weakened inversion layers, a result of less intense solar radiation, dissipate during winter afternoons as direct solar radiation reaches a peak and heats the ground surfaces, causing air to rise and creating convective air currents.

Air quality in the vicinity of the Santa Monica Mountains varies widely as a result of physiography, climatological conditions, the location or presence of an inversion layer, distance from the coast and the amount of pollutants emitted into the atmosphere. Overall, coastal areas experience better air quality than inland interior valleys and the Santa Monica Mountains exhibit better air quality than the surrounding urban landscape. As a result of air quality standards instituted with the California Clean Air Act, air quality has improved in the Los Angeles area since monitoring began (SCAQMD 1993). However, localized air quality in the mountains would likely continue to degrade as long as expanding development results in increased traffic volumes in and around the mountains.

REGULATORY OVERVIEW

Santa Monica Mountains National Recreation Area, California, is a Class II area under the Federal Clean Air Act (CAA), as amended, located in Ventura County and Los Angeles counties. Ventura County is part of the South Central Coast Air Basin under the authority of the Ventura County Air Pollution Control District (APCD). Los Angeles County is part of the South Coast Air Basin under the authority of the South Coast Air Quality Management District (AQMD). The APCD and AQMD are the governing authorities with primary responsibility for controlling air pollution sources in Ventura County and Los Angeles County, respectively.

NATIONAL AMBIENT AIR QUALITY STANDARDS

The CAA requires the Environmental Protection Agency to identify national ambient air quality standards (NAAQS) to protect public health and welfare. Standards have been set for six pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter less than 10 microns (PM₁₀) and less than 2.5 microns (PM_{2.5}), and lead (Pb). These pollutants are called criteria pollutants because the standards satisfy criteria specified in the act. An area where a standard is exceeded more than three times in three years can be considered a nonattainment area subject to planning and pollution control requirements that are more stringent than areas that meet standards. Table 29 in the Air Quality Tables and Figures appendix presents the Federal and California ambient air quality health based standards.

Table 30 in the Air Quality Tables and Figures appendix shows the federal and California air quality standards attainment designations for Ventura and Los Angeles Counties. Ventura County is in attainment or is unclassified for all federal ambient air quality standards except ozone, and exceeds three California air quality standards ozone, carbon monoxide and particulate matter. Los Angeles County does not meet federal or state standards for ozone, carbon monoxide and particulate matter.

STATE IMPLEMENTATION PLAN

Ventura County APCD and South Coast AQMD are responsible for developing a State Implementation Plan (SIP) for federal and state pollutants for which they are not in attainment. The SIP defines control measures that are designed to bring areas into attainment. Basic components of a state implementation plan include legal authority, an emissions inventory, an air quality monitoring network, control strategy demonstration modeling, rules and emission

limiting regulations, new source review provisions, enforcement and surveillance, and other programs as necessary to attain standards. Emission sources are broken into four main categories: stationary, non-road mobile, on-road mobile, and biogenic.

CONFORMITY RULE

In 1993, the Environmental Protection Agency adopted regulations implementing section 176 of the CAA. Section 176 requires federal actions conform to SIPs for achieving and maintaining the national standards. Federal actions must not cause or contribute to new violations of any standard, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of any standard, delay emission reduction milestones, or contradict SIP requirements. The conformity rule applies only in federal nonattainment areas.

Conformity applies to activities in SMMNRA because Ventura County exceeds the federal ozone standard and Los Angeles County exceeds federal standards for ozone, carbon monoxide, and particulate matter.

VENTURA COUNTY AIR QUALITY MONITORING

Ventura County air has dramatically improved over the years between 1973-2000 (Figure 16 in the Air Quality Tables and Figures appendix), although the federal standard for ozone is still exceeded. Progress has been steady and, overall, the air is getting cleaner year by year. Pollutants are being emitted into the air at a lesser rate, but the weather dictates if the pollutants will disperse or accumulate. Ozone air quality statistics for the past few years are as follows, numbers refer to days over the federal standard:

	<u>1-hour std.</u>	<u>8-hour std.</u>
2000	1	29
1999	2	23
1998	5	32
1997	2	46
1996	17	66



Ozone, the main ingredient of smog, even at low levels, can cause a number of respiratory problems. Several groups of people are particularly sensitive to ozone, especially when they are active outdoors, because physical activity causes people to breathe faster and more deeply. Active children are the group at highest risk from ozone exposure. Active adults of all ages and people with asthma or other respiratory diseases are also at risk from ground-level ozone.

LOS ANGELES COUNTY AIR QUALITY MONITORING

In a continuing trend of significant long-term improvement in air quality in the South Coast Air Basin, the year 1999 recorded a new low in ozone concentrations (Figure 17 in the Air Quality Tables and Figures appendix). However, maximum pollutant concentrations in the region still exceed the federal standards for ozone, carbon monoxide, and particulate matter (PM₁₀ and PM_{2.5}) by a wide margin.

Maximum 1-hour average and 8-hour average ozone concentrations in 1999 (0.17 ppm and 0.143 ppm) were 136% and 168% of the federal 1-hour and 8-hour standards, respectively. The highest 8-hour average carbon monoxide concentration of the year (11.7 ppm) was 123% of the federal standard. Maximum 24-hour average and annual average PM₁₀ concentrations (183 µg/m³ and 72.3 µg/m³) were 121% and 144% of the federal 24-hour and annual standards, respectively. PM_{2.5} concentrations were regularly monitored in the District in 1999 and the federal standards were exceeded at almost all sites monitored. Maximum 24-hour average and annual average PM_{2.5} concentrations (122 µg/m³ and 30.9 µg/m³) were, respectively, 185% and 205% of the federal 24-hour and annual standards.

In 1999, the federal nitrogen dioxide standard was not exceeded, with a maximum

concentration (0.0503 ppm) which was 94% of the standard. The more stringent state standard, however, was exceeded on one day at one location in the Basin. The maximum 1-hour average nitrogen dioxide concentration (0.31 ppm) was 119% of the state standard. State standard for sulfate was also exceeded on one day at one location. The maximum 24-hour concentration (25.6 µg/m³) was 102% of the state standard.

SANTA MONICA MOUNTAINS NRA

There are no ambient air quality monitoring sites within the boundaries of SMMNRA.

The NRA depends on local District monitoring sites for air quality information. A 1998 emissions inventory of pollutants is available for the NRA where stationary, area, and mobile source emissions within the park were calculated. Particulate matter (PM), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs) were estimated for stationary and area sources within the NRA. Stationary sources include fossil fuel-fired space and water heating equipment, fireplaces and wood stoves. Area sources include prescribed burning and campfires. Mobile emission sources in SMMNRA include highway and nonroad vehicles and equipment. Particulate matter (PM), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs) were calculated for mobile sources. When compared to regional emissions NRA air pollution emissions are negligible (see Tables 31, 32, and 33 in the Air Quality Tables and Figures appendix).

STATIONARY AND AREA SOURCE EMISSIONS

Table 31 in the Air Quality Tables and Figures appendix summarizes criteria emissions from stationary sources in Ventura and Los Angeles Counties and compares them to emissions from stationary sources in SMMNRA. The



California Air Resources Board (ARB) data indicate the majority of stationary source NO_x and VOC emissions, which are precursors for ozone formation, are generated by fuel combustion and cleaning solvents, surface coatings, and petroleum production/marketing respectively, in Los Angeles County. These data also indicate that fuel combustion is the source of the majority of CO emissions from stationary sources in Los Angeles County.

Table 32 in the Air Quality Tables and Figures appendix summarizes criteria emissions from area sources in Ventura and Los Angeles Counties and compares them to emissions from area sources in SMMNRA. The California ARB data indicate the majority of area source NO_x and VOC emissions, which are precursors for ozone formation, are generated by waste burning and disposal and solvent evaporation from consumer products respectively, in Los Angeles County. These data also indicate that residential fuel combustion is the major source of CO emissions from area sources in Los Angeles County.

MOBILE SOURCE EMISSIONS

Mobile emission sources in Santa Monica Mountains NRA include highway and nonroad vehicles and equipment. Santa Monica Mountains NRA fleet operates approximately 38 light-duty trucks (LDT), which include pickup trucks, minivans, and sport utility vehicles, and a contractor operates two pickups on a regular basis in the park. Although much of the road vehicle mileage is accumulated outside NPS property, emissions were calculated based on their total mileage. There are 8 individual nonroad vehicles and 56 pieces of equipment at Santa Monica Mountains NRA. Mobile source emissions were characterized and quantified using the California ARB Emissions Factor (EMFAC) model.

The number of visitor vehicles operating in NPS units is often correlated to the number of annual visitors to the park unit. However, Santa Monica Mountains NRA is considered a commuter park, banded on either side by Highway 101 and the Pacific Coast Highway. It is nearly impossible to differentiate between who is visiting the park and who is traveling through, since there are no fee stations into the NRA. Most developed facilities are on the perimeter of the park so visitor vehicle miles traveled within the NRA are minimal.

The ARB estimates average annual emissions from mobile sources in California counties. Table 33 in the Air Quality Tables and Figures appendix is a summary of emissions from mobile sources in Ventura and Los Angeles Counties and compares them to emissions from area sources in SMMNRA. ARB data indicate the majority of mobile source NO_x and VOC emissions, which are precursors for ozone formation, are generated by light duty passenger vehicles in Los Angeles County. These data also indicate that light duty passenger vehicles are the major source of CO emissions from mobile sources in Los Angeles County.

SANTA MONICA MOUNTAINS NRA GMP & EIS ENVIRONMENTAL CONSEQUENCES AIR QUALITY

The number of visitor vehicles operating in NPS units is often correlated to the number of annual visitors to the park unit. However, Santa Monica Mountains NRA is considered a commuter park, banded on either side by Highway 101 and the Pacific Coast Highway. It is nearly impossible to differentiate between who is visiting the park and who is traveling through, since there are no fee stations into the NRA. Most developed facilities are on the perimeter of the park so visitor vehicle miles traveled within the NRA are minimal.



The majority of air pollution in the Santa Monica Mountains NRA is transported from mobile sources outside the park, especially from Los Angeles County and the surrounding area. In the GMP SMMNRA proposes to institute a variety of transportation management actions to reduce the number of individual trips to the park, such as providing shuttle buses within the park, transit coordination with surrounding communities, transportation education, and park and ride facilities. These actions will result in local improvements to future traffic patterns near SMMNRA.

Actions within the SMMNRA General Management Plan are included in the 1998 Regional Transportation Model developed by the Southern California Association of Governments (SCAG). The Model is used to generate information about existing and future traffic amounts, patterns, and congestion for the greater Los Angeles area. It takes into consideration all planned land developments and estimates the most likely amount and type of future development that would occur in the area. Traffic volumes for the year 1998 were used to reflect existing conditions and the year 2015 was used for the planning year horizon analysis.

The proposed alternatives do not include building new roads or expanding existing roads. According to the SCAG Regional Transportation Model transit patterns would experience only minor or negligible traffic increase in any particular area of the NRA in the future. There will be no change in the existing or projected levels of service required in the NRA from proposed actions.

CONFORMITY RULE

Section 176 of the Clean Air Act requires that federal actions conform to State Implementation Plans (SIP) for achieving and maintaining the national standards. Federal actions must not cause or contribute

to new violations of any standard, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of any standard, delay emission reduction milestones, or contradict SIP requirements. The conformity rule applies only in federal nonattainment areas.

Conformity applies to activities in SMMNRA because Ventura County exceeds the federal ozone standard and Los Angeles County exceeds federal standards for ozone, carbon monoxide, and particulate matter. SMMNRA conforms to the Clean Air Act because emissions from existing and projected future traffic at SMMNRA were included in the Regional Transportation Model that was used to develop the Transportation Improvement Plan (TIP) in the Regional Transportation Plan for the greater Los Angeles area. The Regional Transportation Plan is the planning document used by the local air pollution control agencies to demonstrate attainment to the federal Clean Air Act pollutant standards, and conformity.

Soundscapes

“The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregation of all natural sounds that occur in parks, together with the physical capacity for transmitting natural sound. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials.” (NPS *Management Policies* 4.9, *Soundscape Management*, NPS 2001.)

According to the *Merriam-Webster* dictionary, noise is defined as any sound that is undesired or interferes with one’s hearing of something. Noise pollution is defined as annoying or harmful sound in an environment.

Sound is the result of pressure waves created from objects being set into vibration. The range of magnitude from the faintest to loudest sounds humans can hear is so large that sound pressure is expressed on a logarithmic scale in units called decibels (dB). Under the logarithmic dB scale, two noise sources, each omitting a noise level of 60 dB, combine together to yield a noise level of 63 dB (not $2 \times 60 = 120$ as one might expect). In other words, a doubling of the noise source produces only a 3-dB increase in the sound pressure level. Noise studies have shown that this increase is barely detectable by the human ear. To simulate how humans hear various frequencies of sound, the overall frequency spectrum is measured as A-Weighted dB (dBA). These are physical sound measurements (of pressure waves) that can be made with sensitive instrumentation. Loudness, on the other hand, refers to how individual humans subjectively judge a sound.

Noise levels from traffic depend on several factors, including:

- volume
- speed
- percentage of trucks
- topography
- distance from the roadway to the receptor
- condition of roadway and vehicle(s)

Generally, an increase in volume or speed would increase traffic noise levels. Distance is an important factor as noise levels diminish rapidly with increasing distance from the source. Sound intensity decreases in proportion with the square of the distance from the source. For a point source such as stationary construction equipment, noise levels would decrease 6 dBA for every doubling of distance. Sound levels for highway line sources vary differently with distance, because sound pressure waves are propagated all along the lines and overlap

at the point of measurement. A long, closely spaced continuous line of vehicles along a roadway becomes a line source and produces a 3 dBA decrease in sound level for each doubling of distance.

Noise Standards

Environmental noise is commonly expressed as the equivalent sound level (L_{eq}), which can be considered the average noise level. L_{eq} places more emphasis on occasional high noise levels that accompany and exceed general background noise levels. L_{eq} measured over a one hour period is the hourly L_{eq} ($L_{eq(h)}$), which is the standard the Federal Highway Administration (FHWA) uses for roadway noise impact and reduction analyses. Related levels of noise impact measurement are defined as follows:

- **L_{max}** – the instantaneous maximum noise level that can occur during any period of time. Usually a single event of short duration.
- **L_{min}** – minimum sound level during a period of time.
- **L_{10}** – sound level that is exceeded only 10percent of the time.

Applicable noise regulations and guidelines provide a basis for evaluating noise impacts.

The current FHWA procedures for highway traffic noise analysis and abatement are contained in 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise". These procedures indicate that a traffic noise impact occurs when the predicted levels approach or exceed the noise abatement criteria (NAC) or when predicted traffic noise levels substantially exceed the existing noise level, even though the predicted levels may not exceed the NAC. The FHWA Noise Abatement Criteria for various areas are defined in Table 10.



Table 10

FHWA NOISE ABATEMENT CRITERIA (NAC) Hourly A-Weighted Sound Level in Decibels (dBA)*			
Activity Category	$L_{eq}(h)$	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above
D	—	—	Undeveloped lands
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums

* Either $L_{eq}(h)$ or $L_{10}(h)$ (but not both) may be used on a project.

The vast majority of the lands within the SMMNRA fall within Category B. A small portion of the lands within the SMMNRA, such as commercial property, fall within Category C. The criteria for Category B are 67 dBA. The criteria for Category C are 72 dBA. The FHWA considers a noise impact to occur if predicted $L_{eq}(h)$ noise levels approach within 1 dBA of the noise abatement criteria, which in this case would be 66 dBA for most park lands and 71 dBA for commercial areas.

Critical Receptors

The critical noise receptors within the SMMNRA that meet the criteria of Category B would include the recreation area lands along the road corridors, trailheads and trails located at various sites throughout the SMMNRA. Other visitor-use facilities within the recreation area and residences along the road corridors (most of which are located more than 60 meters from the road) also qualify. The areas that would meet Category C requirements include commercial establishments along the Pacific Coast

Highway (PCH) (some of which are located within 60 meters of the roadway). Other locations similar to these in condition and proximity to the highways could expect the same noise levels.

Noise Level Estimates

No actual noise measurements were made as part of this GMP/EIS evaluation. Instead, noise estimates were made using the FHWA noise-estimating procedure outlined in FHWA-RD-77-108. This procedure estimates traffic noise using the traffic volumes and the number of large and medium trucks in the traffic mix. Table 11 presents the results of this noise estimating process.

The noise estimate locations were selected where traffic noise from a road corridor within the SMMNRA is dominant and these locations are thus representative of other sensitive receptors within the corridor. The dominant source of noise within the SMMNRA is assumed to come from automobile and truck traffic on the major

road corridors. Other noise sources include aircraft flyovers, traffic on minor roads and residential streets within the communities, and construction activities.

The estimates in the table indicate that several areas currently have road noise that is near or exceeds the NAC of 67 dBA for Category B and 72 dBA for Category C.

Soils and Geology

The Santa Monica Mountains are the southernmost mountain chain in the east-west trending, or transverse ranges of southern California. Numerous faults, folds, down warps and a complex geologic structure characterize the transverse ranges. Their structure could be attributed to the effects of plate tectonics, as the continental North American plate and the oceanic Pacific plate collide. The San Andreas Fault delineates the northern boundary of the transverse ranges.

An extraordinary number of deeply incised north-south trending canyons, including Puerco, Solstice, and Latigo, and Escondido Canyons, drain from the mountains into the Pacific Ocean. More than 40 separate watersheds are encompassed within the SMMNRA boundary. This range, some 46 miles long, incorporates coastal, valley and mountain geomorphology. The full range of geologic composition is present. The western end of the mountains is igneous (extrusive volcanic). It shifts in the east to a sedimentary base, and the eastern end of the range contains metamorphic and older plutonic (intrusive) rocks. The mountains are considered to be a large symmetrical anticline, with the steepest plunge situated near Griffith Park. The Santa Monica Mountains average 7.5 miles in width and have a mean elevation of 1000 feet. The highest point is Sandstone Peak (actually a volcanic formation) with an

Table 11

NOISE LEVEL ESTIMATES				
Route	From	To	1998 ADT	Estimated Noise Level* $L_{eq}(h)$
U.S. Hwy 101	Las Virgenes Rd.	Kanan Rd.	183,200	73.8
Mulholland Hwy.	Topanga Canyon Blvd.	Old Topanga Canyon Rd.	7,400	60.8
Mulholland Hwy.	Topanga Canyon Blvd.	Malibu Canyon Rd.	2,800	58.8
Mulholland Hwy.	Kanan Dume	SR 23	150	56.6
PCH	I-10	Sunset Blvd.	68,700	69.5
PCH	Malibu Canyon Rd.	Kanan Dume	26,000	64.5
PCH	SR 23	Point Mugu	10,800	63.0
Topanga Canyon	PCH	Mulholland	14,200	62.1
Malibu Canyon Rd.	PCH	Mulholland	22,800	67.5
Kanan Dume Rd.	PCH	Mulholland	10,700	60.5
SR 23	PCH	Mulholland	1,000	53.5

* Estimated noise level is based on the noise generated by evening peak hour traffic volumes at a location 60 meters from the center of the closest travel lane.



elevation of 3,111 feet; the lowest points are, of course, at sea level.

The overall appearance of the Santa Monica Mountains is steep and rugged, with low valleys spaced intermittently along the north and south slopes. Malibu Creek is the only drainage that cuts through the mountains, draining both the Simi Hills and the Santa Monica Mountains. There are no natural lakes, but streams, springs, and seeps are common and widespread.

The Santa Monica Mountains are naturally prone to landslides due to an unstable combination of steep slopes and often poorly cemented sedimentary rock. More than 2,000 quaternary landslide deposits are still apparent in the Santa Monica Mountains and Simi Hills. The ancient quaternary slides represent major events. However, smaller high frequency slides and slumps continue to occur. The 1994 Northridge earthquake alone triggered more than 1400 individual landslides within the mountains (USGS 1995). Landslides of any size have the potential to destroy or damage homes, roads, and utility lines. Residential irrigation and septic tanks have exacerbated the problem – particularly along the coast – by adding water to expansive clay soils.

Debris flows are a type of stream flow that occur with some regularity in the Santa Monica Mountains, where sufficient sediment mixes with the water flow to form a thick slurry of water, soil, and rock with great destructive power. The necessary environment for debris flows is a relatively steep stream channel, a generous supply of sediment from the streambed or adjacent slopes, and sufficient rainfall to mobilize them. Though naturally occurring in the Santa Monica Mountains, debris flows are aggravated by any disturbance of slopes, soils or vegetation, including roads, housing pads, fire control lines, and fires. The intense

development surrounding the Santa Monica Mountains has also altered the natural regime. As streams are channeled and formerly permeable soil is covered with impervious concrete and blacktop, both the amount and velocity of storm runoff is increased, thus increasing the likelihood of debris flows.

The Santa Monica Mountains incorporate the greatest geological diversity of all major mountain ranges within the transverse range province. The mountains are a complex assemblage of marine and non-marine deposition. The topographical relief is a result of differential erosion and plate tectonics (e.g. uplifting, folding and faulting).

The oldest rocks in the Santa Monica Mountains are the Santa Monica slates, a metamorphic, marine sedimentary rock of mid-Jurassic origin. Marine-deposited shales



Slope failure in Topanga Canyon (NPS photo).



Castro Crest
(NPS photo).

and greywacke were metamorphosed by granitic intrusions, forming the black slates, phyllite, spotted slate, and fine-grained schist typical of this formation. The slates make up the basement rocks for the western and central Santa Monica Mountains and are exposed extensively in the range, east of Topanga Canyon. Granitic intrusives were formed as part of the same Mesozoic event that produced the massive granitic batholiths in the Sierra Nevada (Norris and Webb 1978). These granitic intrusions also formed the basement rocks of the eastern Santa Monica Mountains. They are exposed northwest of Hollywood and around Cahuenga Peak. Following the granitic intrusions, the slates were uplifted and gradually eroded until the late Cretaceous. Subsequently, a period of continuous deposition began as the spreading sea began depositing conglomerates, sandstone and shale. Although this deposition was primarily of marine origin, there were short periods of terrestrial deposition. Two depositional events from this period are the Trabuco and Tuna Canyon formations. The thin Trabuco formation consists primarily of conglomerates. The Tuna Canyon formation represents both marine and terrestrial deposition and includes deposits of turbidites (marine sandstone), slate, siltstone and conglomerates. This fossiliferous formation also contains foraminifera, mollusks and ammonites.

The primary uplift, erosion of elevated formations and depositional sea occurred during the Cenozoic era. The Coal Canyon (Martinez) formation represents a period of extensive deposition that resulted in marine shale, conglomerate, sandstone and siltstone. These sediments accumulated to a maximum thickness of 8,500 feet. Some fossils, characterized by the gastropod *Turritella pachecoensis*, occur in the Coal Canyon formation.

From the late Eocene to the early Miocene, a non-marine floodplain deposit of up to 3,500 feet deep was formed. The Sespe formation, or “red-beds,” characterizes this outcropping, consisting mainly of sandstone, siltstone, shale and conglomerates. The floodplain condition persisted until the upper Oligocene, when the seas passed over the site of the present Santa Monica Mountains. Changes in the earth’s crustal behavior occurred as a result of plate tectonics (Vedder and Howell 1980). There was a change in the Pacific and North American plate movements from convergent to right lateral shear, which caused a change in the topography of southern California from a shelf comprised of depositional landforms to the ridges and basins present today.

By the middle Miocene, this sedimentary phase was disrupted with a period of massive volcanic deposition in the western Santa Monica Mountains. In the lower Miocene,



major sedimentary deposits, including the Vaqueros formation, Simi, Lajas, Calabasas, Trabuco, Tuna Canyon and the Topanga formations occurred.

Subsequent to the Miocene deposition, extensive intrusive and extrusive volcanic activity occurred during the middle Miocene in the Santa Monica Mountains. Volcanic formations from this period are called the Conejo Volcanics and are composed of alternating layers of andesitic and basaltic flow-breccias, mudflow-breccias, flows, pillow-breccia and aquagene tuffs, overlying the Topanga Canyon formation (Raven, Thompson and Frigge 1986 from Yerkes and Campbell 1979). The Conejo Volcanics are exposed extensively in the western part of the Mountains, but exist only in a few locations east of Topanga Canyon.

In the late Miocene, subsequent to the Conejo Volcanics, the sandstone, siltstone and sedimentary breccias of the Calabasas formation (western and central Santa Monica Mountains) were deposited. Additionally, 4,500 feet of marine diatomite, shale, sandstone, chert and basal conglomerate deposits resulted in the Modelo formation. These episodes during the late Miocene represented some of the greatest encroachment of the sea in the vicinity of Ventura and Los Angeles.

The geology of the area south of the Malibu coast fault differs from that of the rest of the Santa Monica Mountains (Yerkes and Campbell 1979). This area includes the coast west of Carbon Canyon and Point Dume. The Trancas and Zuma formations that occur here do not occur in the rest of the range, but the Monterey form does occur elsewhere. The Trancas formation is a mixture of sedimentary marine rocks, including sandstone, mudstone, siltshale, claystone and breccia. The Monterey formation is composed of shale and the Zuma formation is volcanic and consists of

basaltic and andesitic flows, breccias, pillow lavas, mudflow breccias and aquagene tuffs. This early to middle Miocene volcanic formation is similar to and correlates with the Conejo Volcanics.

Thick beds of shale, sandstone and clay continued to accumulate during the Pliocene. The Pico formation, characteristic of this period, has a maximum thickness of about 1,000 feet. Vedder and Howell (1980) estimated that the sea was nearly 4,900 feet deep near Ventura and up to 8,200 feet deep near southeastern Los Angeles. The Santa Monica Mountains were a chain of islands within this Pliocene sea. During this era, they were uplifted and eroded to their present form (Bailey and Jahns 1954, Dibblee 1982). In the Pacific Palisades, where deep canyons have been cut through the thick Pleistocene alluvium, Pliocene rocks – soft claystone, siltstone and sandstone – are exposed.

In the early quaternary, more uplift occurred and the area has remained in a dynamic erosional-uplift cycle. This cycle has resulted in extensive alluvial fan deposits surrounding the Santa Monica Mountains in the Los Angeles Basin, San Fernando Valley and Oxnard Plain and fluvial sand and gravel deposits along major stream courses. On the south side of the mountains, remnant sandy marine terraces at Malibu Creek and Point Dume represent former shorelines. Uplift of the Santa Monica Mountains continues today at the rate of one inch per thousand years (measured at Point Dume) and occurs as a direct result of compression plate tectonics, manifested as the numerous small and occasional large earthquakes felt in southern California. Erosive processes (e.g. landslides, gullying, debris flows, etc.) are the converse result of this rapid uplift.

The Natural Resources Conservation Service is currently mapping 15 general soil associations and consociations in the Santa Monica Mountains. These include the following:

- Camarillo Consociation (1)
 - Chumash-Boades-Malibu Association (4)
 - Cotharin-Talepop Association (3)
 - Corralitos-Coastal Beach Association (1)
 - Elder Consociation (2)
 - Kayiwish Association (2)
 - La Jolla Consociation (2)
 - Mipolomol-Topanga-Rock Outcrop Complex (4)
 - Pacheco Consociation (1)
 - Sulfic Fluvaquents, frequently flooded, Consociation (1)
 - Cumulic Haploxerolls-Riverwash Association (2)
 - Topanga-Mipolomol-Sapwi Association (4)
 - Zumaridge-Greenbark, moderately deep-Rock Outcrop Complex (4)
 - Castaic-Linne-Los Osos Association (5)
 - Gazos-Lockwood-Rincon Association (6)
- (1). The geomorphic areas in which they occur can identify these soil groupings. The first geomorphic grouping is the outwash plain of Calleguas Creek, which occurs in the extreme western area of the recreation area near Point Mugu Pacific Missile Test Center (U.S. Navy). These are level, somewhat poorly drained soils that formed in alluvium from mixed rock sources. These areas are in the tidal floodplain of Mugu Lagoon or within the military facility.
- (2). The second geomorphic grouping is the mountain valley fan remnants and axial stream floodplains within the mountains themselves, such as La Jolla Valley and

Serrano Valley. These are moderately sloping to gently sloping, moderately well to well-drained soils that formed in alluvium, residuum and colluvium from sedimentary rock sources and/or basic igneous rock sources.

- (3). The third geomorphic grouping is found within igneous hills and mountains such as Sandstone Peak. These are moderately sloping to very steeply sloping, well-drained soils that formed in residuum and colluvium from basic igneous rock sources.
- (4). The fourth geomorphic grouping is the non-marine sedimentary shale and sandstone hills and mountains such as Castro Peak and Laguna Peak. These are moderately sloping to very steeply sloping, well-drained soils that formed in residuum and colluvium from shale and sandstone.
- (5). The fifth geomorphic grouping is the marine sedimentary shale and sandstone hills, such as the Simi Hills. These are moderately sloping to steeply sloping, well-drained soils that formed in residuum and colluvium from marine sediments.
- (6). The sixth geomorphic grouping is the Malibu Plain and other ocean terraces and alluvial fans adjacent to the ocean. These are the gently to moderately sloping, well-drained soils that formed in alluvium from mixed rock sources.

Another important concern is the shrink-swell behavior and erodibility of soils throughout the mountains. Ungraded, native soils in lowlands exhibit the highest potential for shrinkage and swelling, and would have to be removed or extensively modified before development could occur. A majority of these features may be attributable to the erosion characteristics of the underlying bedrock. Rocks and soils prone to instability include alluvium, terrace deposits, shale, metamorphic schist and siltstone.



Soil erosion typically results from concentrated runoff on unprotected slopes or along unlined stream channels. Soil erosion has largely been reduced throughout much of the urban areas due to soil coverage by paved development. The SMMNRA could experience substantial erosion from runoff if the vegetation cover is destroyed by brushfire or removed by grading operations.

The project area, like all of southern California, is located in a highly active tectonic region where strong ground shaking results from earthquakes on nearby or more distant faults. The potential seismic effects that would be expected in the SMMNRA include the potential for ground ruptures along fault lines, damage to structures due to seismically induced ground shaking, potential for vertical amplification of the earthquake's energy, and earthquake-induced liquefaction. The criteria followed relative to fault activity are those enacted by the state of California and utilized by the California Division of Mines and Geology (CDMG) in the Alquist-Priolo Act. This act establishes special study zones for active or potentially active faults to prevent the construction of urban development on the surface trace of active faults. According to the state of California, an active fault is described as having evidence of surface rupture within the last 11,000 years (Holocene time).

Numerous generally east-west trending faults occur within this area of the Santa Monica Mountains. According to the *Santa Monica Mountains North Area Plan* (1999), (NAP), the northern portion of the project area consists of no active faults, but is subject to surface ruptures during earthquakes along nearby faults. Along the southern portion of the project area, the Malibu coast fault has been mapped along the coast generally paralleling PCH. Portions of this fault have been identified as active, according to the state of California, and have been included

within an Alquist-Priolo fault rupture hazard zone. The Sycamore Canyon and Boney Mountain faults have been mapped on the extreme western portion of the project area and are considered to be potentially active by the state of California. Numerous other faults have been identified within the eastern portion of the project site resulting from continuing uplift within the Santa Monica Mountains, and southern California in general.

Ground shaking resulting from earthquakes within the project area may create fractures to the bedrock in any given area. The impact of seismic forces on bedrock is dependent upon its proximity to the earthquake epicenter (e.g., bedrock located on the fault may be affected more than bedrock located some distance from the fault) and material strength. These forces could cause changes in the geologic structure of bedrock and may cause preferential directions of fractures or joints in bedrock.

Besides directly damaging structures, roadways, and utilities, earthquakes could trigger landslides in unstable areas, endangering lives and property. Because of local groundwater and soil conditions, liquefaction is another potential hazard in localized areas with high groundwater and sandy soils. Liquefaction is the process in which solid granular materials behave for a short time as a dense fluid, rather than as a solid mass, which results in a potential for permanent ground displacements. Conditions favorable to liquefaction of soil are (1) thick deposits of highly saturated, loose, granular material, (2) an unconfirmed groundwater condition, and (3) sudden seismic loading.

Several active and high potential landslides have been identified within the SMMNRA area based on a review of historic aerial photographs, field investigations, and maps contained within the joint "Seismic Safety Study" of Los Angeles County and

Ventura County. The Santa Monica Mountains are notorious for slope instability and land sliding. Over-steepening of the slopes, in addition to erosion of canyons and drainages, has created a landscape that is highly susceptible to slope failure.

Shallow slope failures such as mudslides and slumping have occurred where graded cut and fill slopes have been inadequately constructed. Mudslides have the potential to occur with great suddenness and destructive force, thereby constituting a significant threat to life and property in the hillside areas. Soil slumping is a slower process that could also potentially cause extensive structural damage, as well as rockfall areas located at the base of steep slopes which have fractured rock outcrops or large exposed boulders.

Water Resources

The aquatic resources of the Santa Monica Mountains are very diverse. Dozens of north-south canyons parallel each other throughout the mountains. Each of these has an intermittent or perennial stream, with associated riparian vegetation lining it. In addition, there are a large number of east-west trending drainages coming down the slopes of these canyons. Figure 10 illustrates the intermittent and perennial streams within the SMMNRA.

The drainage network for the Santa Monica Mountain Zone (SMMZ), which is the overall region that extends beyond the boundaries of the recreation area, is comprised of numerous major arterials and tributaries that reflect a high degree of organization. A total of 828 stream segments can be identified from USGS Quadrangle maps of the SMMZ. These include 179 major streams with 49 coastal outlets. Within the SMMZ are a total of 656 first order stream segments, 137 second order, 29 third order, five fourth order, and one fifth order stream. The first order segments are generally of

short duration, flowing in a relatively straight course with origins in the higher elevations. The higher the stream order, the greater a stream's tendency to travel greater distances and increase its sinuosity.

The largest watershed located completely within the SMMZ is the Malibu Creek watershed, with its headwaters in the Ahmanson Ranch. It contains a total of 105 square miles and incorporates several major drainage basins (Medea Creek, Triunfo Creek, Cold Creek, Malibu Creek, Sleeper, Las Virgenes, and Potrero Valleys). The Malibu Creek watershed contains a total of 225 stream segments within six major drainages.

Conversely, the smallest stream courses in the Santa Monica Mountains are the isolated drainages. These streams represent those segments, which are unnamed on USGS Quadrangle maps and in most cases, are only first order streams. This group comprises 17 percent of all streams and consists of 131 segments.



*Freshwater
stream in the
SMMNRA
(NPS photo).*



A wide variety of wildlife and localized plant communities can be found associated with the streams of the Santa Monica Mountains. These include at least two populations of wild trout, including one of the southernmost runs of the endangered steelhead (*Oncorhynchus mykiss*) in the U.S., a diverse array of aquatic insects, remnant populations of big leaf maples (*Acer macrophyllum*), cottonwoods (*Populus* sp.) and alder (*Alnus* sp.). The arroyo chub (*Gila orcutti*) is found in Malibu Creek and the tidewater goby (*Eucyclogobius newberryi*) was recently reintroduced (1991) to Malibu Lagoon.

In creeks that feed from the developed recreational/water supply lakes in the mountains, a variety of non-native fauna have been introduced. This is a significant concern throughout southern California. For example, at least 28 species of non-native fish have become established in southern California streams (USFWS 1989). In Trancas Creek in the Santa Monica Mountains, goldfish, largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) have all been observed. In the Malibu Creek drainage, including Malibu Lagoon, largemouth bass, black bullhead (*Ictalurus melas*), green sunfish (*Lepomis cyanellus*), mosquito fish (*Gambusia affinis*), Oriental shrimp (*Palaemon macrodactylus*) and crayfish (*Procambarus clarki*) are known to occur. Recent research has demonstrated the serious consequences of the presence of several of these introduced species for native aquatic species populations (Gamradt and Kats 1996; Goodsell and Kats 1999).

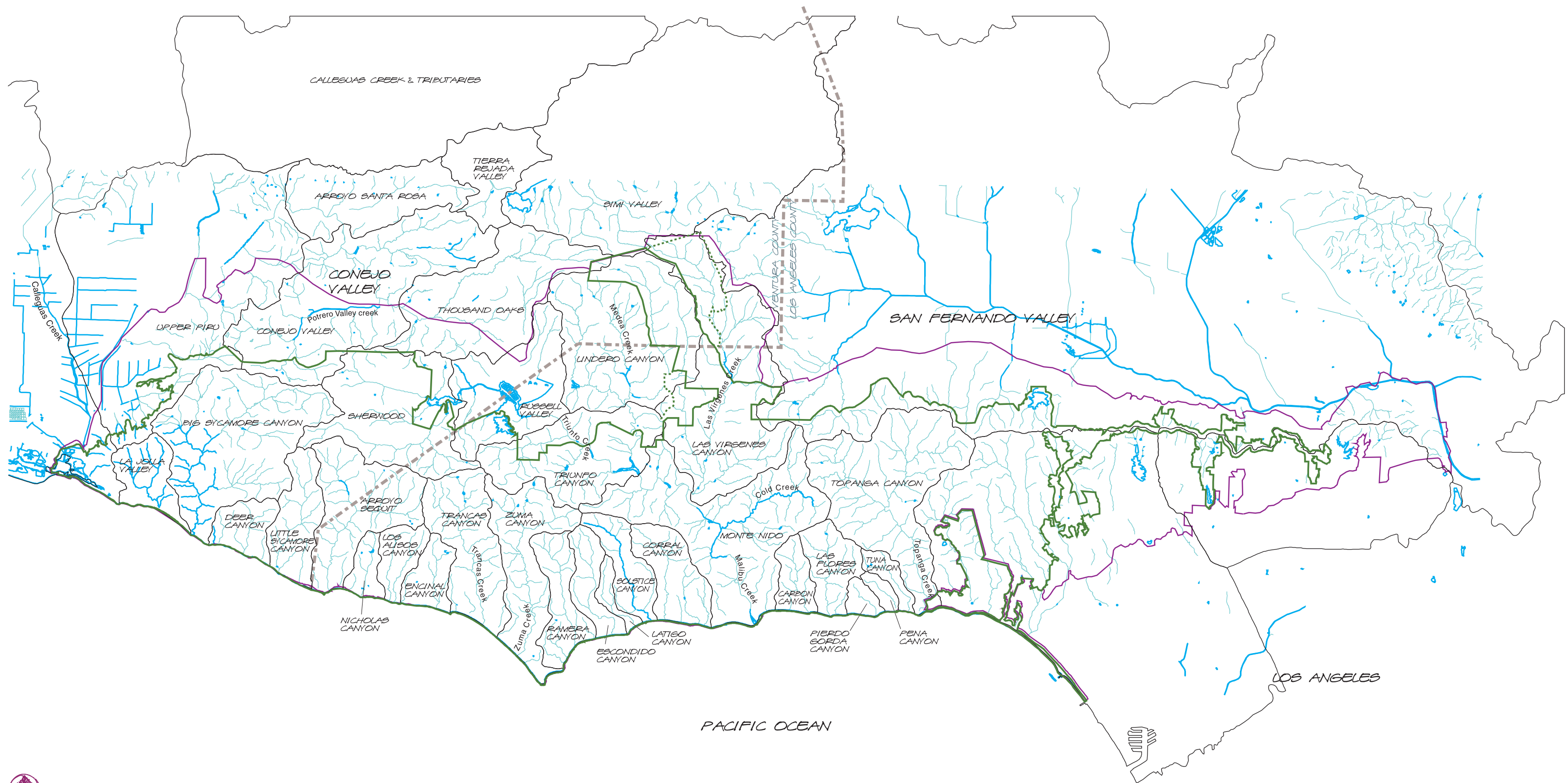
Runoff generated from developed areas has placed increasing pressure on the existing fresh water resources. Runoff from urban developments (e.g., roads, parking lots, residential areas) generally contributes more runoff, more quickly and with higher concentrations of pollutants than

pre-development areas. The runoff from the developed areas could contain elevated levels of nutrients (such as phosphorous and nitrogen), pathogens, toxicants (e.g., heavy metals), and litter and trash loads. The impacts of these pollutant inputs on the health of the fresh water systems could be minimized through effective management of runoff from developed areas.

Floodplains

Within the Santa Monica Mountains most of the 100 and 500-year floodplains have not been delineated because the watersheds have not been extensively developed. In areas with the greatest development, however, floodplains were delineated for the FIRMS program (Flood Insurance Rate Maps). Most of these maps for Los Angeles and Ventura Counties have been acquired and are currently on file at park headquarters. The coverage for Ventura County is extremely limited, and those areas where delineations were made are mostly in the preliminary phase of development. Those panels, which are completed and printed, have been acquired. The FIRM maps do not take into account debris flows, which could exceed the elevations of water-based flows and rapidly change channel geometry.

Debris flows are a type of stream flow that occurs with some regularity in the Santa Monica Mountains, where sufficient sediment mixes with the water flow to form a thick slurry of water, soil and rock with great destructive power. With water content of about 450%, these debris flows have tremendous weight, and are so viscous that they could carry boulders several feet in diameter. The necessary ingredients for debris flows are a relatively steep stream channel, a generous supply of sediment from the streambed or adjacent slopes, and sufficient rainfall to mobilize them. The management significance of debris flows are



- LOS ANGELES / VENTURA COUNTY LINE
- SMMNRA BOUNDARY
- SMMNZ BOUNDARY
- INTERMITTENT STREAMS
- PERENNIAL STREAMS
- WATERSHED BOUNDARY

FIGURE 10:
WATER RESOURCES
 SANTA MONICA MOUNTAINS
 NATIONAL RECREATION AREA
 CALIFORNIA

INCLUDES UNITS OF NPS, CALIFORNIA STATE PARKS,
 AND THE SANTA MONICA MOUNTAINS CONSERVANCY
 United States Department of the Interior • National Park Service
 SAMO • April 2002 • 638 • 20072



ENDANGERED STEELHEAD TROUT

THE NATIONAL MARINE FISHERIES SERVICE declared the southern steelhead trout as an endangered species in August 1997. Within the park, it is believed that self-sustaining populations of southern steelhead trout once resided in Calleguas, Big Sycamore, Arroyo Sequit, Zuma, Malibu, Solstice and Topanga Creeks, to mention a few. Today, however, only a small number of steelhead trout spawn in Arroyo Sequit, Topanga and Malibu creeks. One of the primary reasons for the severe decline in steelhead numbers is the creation of innumerable human-made barriers to steelhead migration, such as road culverts, low-water crossings, and small and large dams.

To meet this challenge, each alternative would incorporate goals for removing or modifying barriers to migrating southern steelhead trout in all Santa Monica Mountains National Recreation Area creeks where steelhead currently survive or were once present. One of the park goals would be to preserve and protect estuarine and wetland habitat that is important to the restoration of the species. The park would continue to work with numerous federal, state, and local partners and the general public to achieve the goal of removing or modifying barriers to migrating steelhead throughout the park. Two critical steelhead restoration projects are highlighted below.

Restoration of the Solstice Creek steelhead would be accomplished by providing access to habitat above two highway culverts, four low-water crossings, and several human-made ponds that block up and downstream passage of steelhead moving up and down stream. This project would provide cost-effective removal or modification of all significant barriers to migrating steelhead in Solstice Creek.

The key to restoration of Malibu Creek southern steelhead trout lies in providing access to habitat above Rindge Dam. The single most significant impediment to the restoration of the Malibu Creek run of steelhead trout is the 102-foot high Rindge Dam in the creek about 2.5 miles upstream from the Pacific Ocean. To address this problem, the U.S. Army Corps of Engineers and the California Department of Parks and Recreation are cooperating on the *Malibu Creek Environmental Restoration Feasibility Study EIS*. The study would evaluate the impacts of five alternatives on recovery of steelhead in Malibu Creek and the beneficial use of accumulated sediment stored behind the dam.



that they commonly exceed the levels of predicted floods (because they have up to 2.5 times the volume of floods consisting of water alone), and they tend to drop sediment in inopportune places such as culverts, buildings, stream channels and roads.

Though naturally occurring in the Santa Monica Mountains, debris flows are aggravated by any disturbance of slopes, soils or vegetation, including roads, housing pads, fire lines and fires. The Los Angeles County Department of Public Works (LACDPW) considers flooding conditions to be the occurrence of a fifty-year rainfall. In the Santa Monica Mountains, this is 12–15 inches of rain in a 24-hour period. Isohyetal maps of this area, show this occurs at the higher elevations and this amount of rainfall requires a longer time span to occur at the lower elevations. Flooding, however, is not only a factor of the amount of rainfall. Fires, construction projects, previous rainfall immediately prior to a heavy rainfall and other factors could contribute to flooding. The FIRM maps do not give any indication of the sequelae (resultant conditions) of flooding such as erosion, silting or debris flow. In contradistinction to Los Angeles County, they only deal with 100- and 500-year rains. However, the LACDPW in its *Hydrology and Sedimentation Manuals*, 1991, identifies the soil types and debris and sedimentation formation relative to the rainfall zone. Computer programs are available from LACDPW to calculate storm flows in various watersheds.

The uses of the water resources in the SMMNRA are extremely varied. Recreational uses near saltwater or freshwater areas could range from direct contact to no contact. Direct contact recreation at the saltwater beaches includes swimming, surfing, scuba diving, snorkeling, bathing, tidepool visiting and water play. In the freshwater resources,

direct contact activities include swimming and water play. The non-contact water recreation for saltwater areas includes fishing, boating, sailing, whale watching, surf fishing, sun bathing, picnicking, and beach sports such as volleyball. Freshwater noncontact activities include fishing, nature walks, picnicking, birding and sailing model boats.

Natural habitat use of water is equally varied. The warm freshwater habitats, including wetlands, are productive habitats for sedges, tules and cattails. The wildlife using these wetlands includes the great blue heron, peregrine falcon, red-winged blackbird and western aquatic garter snake. The riverine fresh water habitat contains steelhead and rainbow trout, and introduced species such as bluegill, green sunfish and large mouth bass. Other species in this system are southwestern pond turtle, California slender salamander, California newt, Monterey ensatina, arboreal salamander, California toad and Pacific tree frog. There is barrier free access to the ocean at the mouths of many of these riverine habitats. The salt wetlands such as Malibu Lagoon and Mugu Lagoon are breeding grounds for many small fish, and the tidewater goby resides in Malibu Lagoon. Mugu Lagoon additionally is a breeding ground for the harbor seal. The California least tern, brown pelican and Belding's savanna sparrow are among the residents of these areas. The mammalian wildlife uses the fresh water for drinking. There are carnivores such as mountain lions and bobcats. Coyotes, deer and much other wildlife are also present in this area. Rodents, reptiles, amphibians and insects, too numerous to mention, survive in the SMMNRA on the fresh water springs, seeps and surface waters. Reclaimed water is used for irrigation of hay and alfalfa fields as well as golf courses and other lawn areas. The



WATERSHED MANAGEMENT

HOT, DRY SUMMERS and mild, wet winters characterize the park's Mediterranean-type climate with moderate to heavy rainfall that creates major ecological and environmental impacts. The importation of water from outside the Los Angeles basin has dramatically changed forever the relationship of humans to the water resources in this semi-desert environment that receives an average of only about 15 inches of rainfall per year. With imported water, human population densities changed dramatically from only about 10 people per square mile to several thousand people per square mile. As a result of increasing population, urban encroachment and development have become the greatest threat to the recreation area's aquatic resources, including greater impacts to water quality and quantity, wetland and marine habitats, native plants and animals by exotic species invasions, and wildlife harvesting.

To meet these challenges, each alternative would incorporate goals for planning and constructing facilities and operating programs that protect the ecological integrity and natural functioning of the park's terrestrial and marine aquatic resources. The park would continue to work with numerous federal, state, and local partners and the general public in watershed management planning and implementation to achieve the goal of protecting the park's aquatic resources from a variety of threats. Interpretive programs and literature would be provided to the public to increase understanding of water resources issues and problems. Monitoring and evaluating park waters to ensure health standards are constantly met would protect public health.

ground water is recharged in percolation ponds near the reclamation plant. Some of the reclaimed, tertiary-treated water is discharged directly into Malibu Creek.

Tens of millions of people use the southern California beaches in the summer. The health and safety of these people are of primary concern. Upland contamination

could affect beach-goers, creating an unwelcome and unhealthy experience. Beach use becomes unsafe when minimal fresh water flows from the creeks to the ocean. Individuals who swim in the stagnant water in the lagoons at these times may be exposed to unhealthy concentrations of harmful substances.





Mugu Lagoon (NPS photo).

During the remainder of the year, upland areas are used more than the beaches. Visitation in the fall, winter and spring months is not as great as in the summer, but there is never a time when visitors are absent. The cumulative effects of visitation on aquatic resources must always be regularly monitored and mitigated.

Biological Resources and Wetlands

VEGETATION

Munz (1974) identified the following plant communities in the Santa Monica Mountains: coastal strand, coastal salt marsh, freshwater marsh, coastal sage scrub, chaparral, valley grassland and southern oak woodland.

Raven et al. (1986) uses the following vegetation community classification system: chaparral, coastal sage scrub, southern oak woodland, valley grassland, riparian

woodland, intermittent stream bed, lake, pond and quiet stream aquatic, freshwater marsh, coastal strand, coastal salt marsh, marine meadow, and surfweed.

The following is a more comprehensive summary of the major vegetation types found in the Santa Monica Mountains. In this summary, 12 communities are identified, which are derived from 26 vegetation associations identified by the California Natural Diversity Database classification system (Holland 1986). Figure 11 illustrates the vegetation types that occur within the SMMNRA.

In general, vegetation communities of the Santa Monica Mountains are determined by the following factors: presence of water, elevation, aspect, soil, proximity to the ocean, and presence or frequency of fire.

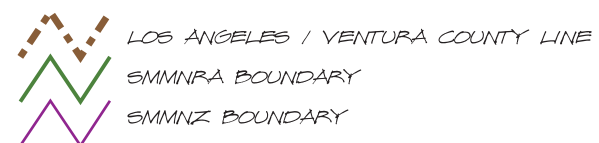
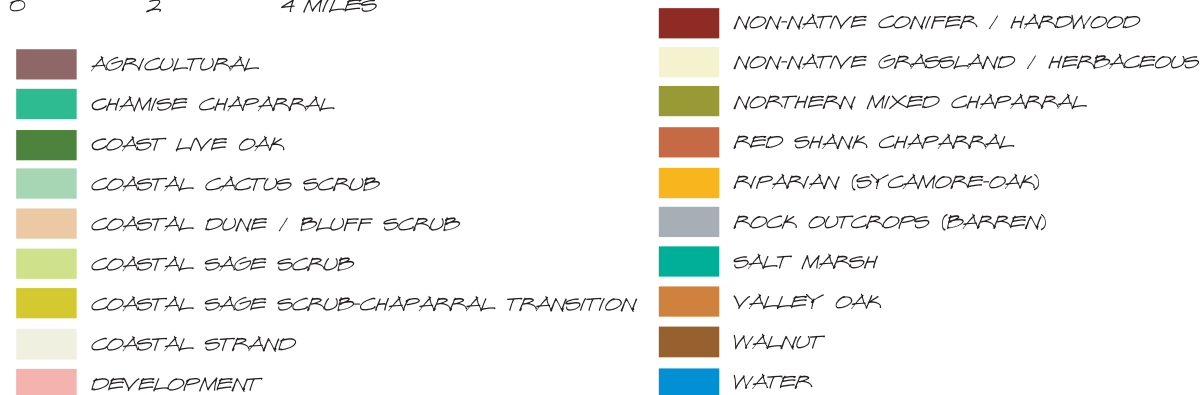
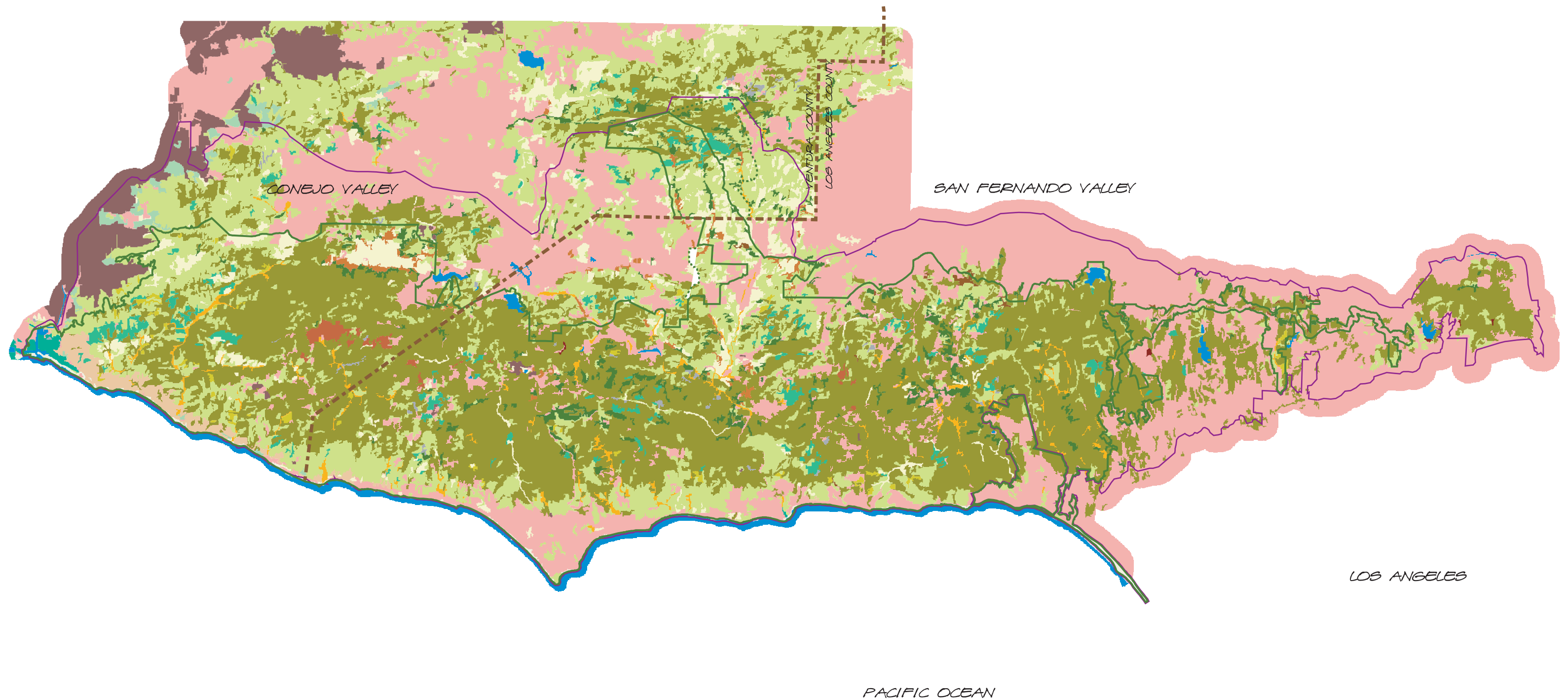


Figure 11:

VEGETATION

SANTA MONICA MOUNTAINS
NATIONAL RECREATION AREA
CALIFORNIA

INCLUDES UNITS OF NPS, CALIFORNIA STATE PARKS,
AND THE SANTA MONICA MOUNTAINS CONSERVANCY

United States Department of the Interior • National Park Service
SAMO • April 2002 • 638 • 20073

► Coastal Salt Marsh

Coastal salt marsh occurs nearest the ocean where perennial water flows from inland sources. Plants in this community are adapted to a high concentration of salt, very little wave action and oxygen-depleted soils. Succulence, usually associated with desert vegetation, is a common characteristic of plants growing in the coastal salt marsh. Some representative plants include pickleweed (*Salicornia*), dodder (*Cuscuta salina*), salt grass (*Distichlis spicata* sp.), and sea blite (*Sueda californica*). Examples of this type of plant community in the Santa Monica Mountains can be found around Malibu and Mugu Lagoons.

Of an estimated 26,000 acres of original coastal wetlands, occurring from Santa Barbara to the border with Mexico, approximately 8,500 acres remain. This represents a 67 percent reduction in this community type (NRMP 1982). The dramatic reduction in area makes this community especially important in the Santa Monica Mountains.



Coastal Salt Marsh (NPS photo).



Coastal Strand.

► Coastal Strand

Forty-one miles of California coastline, with exposures ranging from sandy beaches to rocky tidepools and lagoons, lie within the recreation area boundaries. Much of this community has been changed by development or converted to encompass recreational uses in coastal areas.

Characterized by strong winds, salt spray, fog, intense solar radiation, drought conditions and an infertile, unstable substrate (sand), this community extends from the high tide zone inward in a narrow band. Many of the plants in this community have adapted to shifting sands, with stems that lay prostrate over the sand, or leaves that curve downward and lay flat along the sand. Some leaves have sticky or hairy surfaces, which gather sand grains to act as ballast, holding them down during high winds. Many of these plants reproduce and spread by rhizomes. Salt spray, slow nutrient cycling and desiccating winds contribute to a desert-like environment. This plant community occurs along the southwest edge of the mountains, east of Point Mugu. Characteristic plants include sand verbena (*Abronia maritima*), silver beachweed (*Ambrosia chamissonis*), saltbush (*Atriplex* sp.), beach morning glory (*Calystegia*



soldanella) and the alien iceplant or hottentot fig (*Mesembryanthemum* sp.). Characteristic wildlife includes willets, sanderlings, western gulls and a variety of other species adapted to coastal strand environments.

► **Coastal Sage Scrub**

In the Santa Monica Mountains, coastal sage scrub occurs on drier sites and lower elevations than chaparral, especially on coastal south-facing slopes. Coastal sage scrub is also common in inland areas of the Simi Hills within the SMMNRA. Often occurring in recently eroded areas, this community plays an important role in soil stabilization. Many of its characteristic plants produce soil-holding, fibrous shallow roots. Soils underlying coastal sage scrub tend to be low in nutrients and subject to rapid erosion, comprised of a high percentage of sand and gravel.

The coastal sage scrub community has been referred to as “chaparral” since soft-leaved, grayish green, aromatic shrubs characterize the widely spaced vegetation. Characteristic plants include purple sage (*Salvia leucophylla*), California sagebrush (*Artemisia californica*), coast goldenbush (*Haplopappus venetus*) and coastal buckwheat (*Eriogonum cinereum*) and the larger laurel sumac (*Malosma laurina*) or lemonadeberry (*Rhus integrifolia*) shrubs.

Many species in this community, particularly the sages, are summer or drought deciduous, dropping larger leaves during mid-summer to conserve moisture.

Good examples of coastal sage scrub can be found at the mouth of Zuma Canyon and in coastal Point Mugu State Park. Characteristic wildlife includes Anna’s hummingbirds, rufous-sided towhees, California quail, greater roadrunners, Bewick’s wrens, coyotes and coast horned lizards.



Coastal Sage Scrub (NPS photo).

► **Chaparral**

Chaparral, the dominant vegetation community in the Santa Monica Mountains, is characterized by deep-rooted, drought and fire-adapted evergreen shrubs growing on coarse-textured soils with limited water-holding capacity. Unlike other plant communities, in chaparral, a nearly impenetrable vegetative wall of stiff stems and leathery leaves is formed by the four- to 12-foot-high plants. Underneath, the ground is devoid of herbaceous vegetation, except for an occasional clump of foothill needlegrass (*Nassella lepida*) or cluster of wildflowers.

The drought-adapted leaves of chaparral plant species are often small, leathery, thick, fuzzy and/or waxy. Depending on the species, chaparral plants may reproduce after fire either by seeds or stump-sprouting, or both. Various subcommunities, dominated by one or more species are described below.

Mixed chaparral is found throughout the Santa Monica Mountains on moist, north facing slopes. It contains a number of woody vines and large shrubs, including scrub oak (*Quercus berberidifolia*), greenbark or spiny ceanothus (*Ceanothus spinosus*), mountain

mahogany (*Cercocarpus betuloides*), toyon (*Heteromeles arbutifolia*), hollyleaf redberry (*Rhamnus ilicifolia*), sugarbush (*Rhus ovata*) and manzanita (*Arctostaphylos* spp.).

Red shank and mexican chaparral is an unusual plant community that occurs in four distinct populations in California: southern San Luis Obispo County, Santa Monica Mountains, San Jacinto/Santa Rosa Mountains and northern Baja California. This community, dominated by red shank (*Adenostoma sparsifolium*), is well developed at Circle X Ranch, but may be found intermittently throughout the Santa Monica Mountains. Red shank chaparral is usually found associated with granitic soils at high elevations where greater precipitation and colder winters enable its growth. In addition to red shank, it includes the following species: chamise, sugarbush and a variety of ceanothus species.

Ceanothus chaparral primarily occurs on stable slopes and on ridges. On some slopes, bigpod ceanothus (*Ceanothus megacarpus*) makes up over 50 percent of the vegetative cover. In other areas, buckbrush ceanothus (*Ceanothus cuneatus*), hoary-leaved ceanothus (*Ceanothus crassifolius*), or greenbark ceanothus may dominate. In addition to ceanothus, the following species may also be present: chamise, black sage (*Salvia mellifera*), and holly-leaf coffeeberry (*Rhamnus ilicifolia*), among other shrubs.

This community is overwhelmingly dominated (80 percent) by chamise, but may also contain black sage and coast goldenbush, sugarbush and a variety of other species.

Characteristic wildlife includes wrentits, bushtits, spotted towhees and California thrashers, bobcats, brush mice, dusky-footed woodrats, western fence lizards and rattlesnakes.



Chaparral (NPS photo).



Coastal Live Oak (NPS photo).

► **Coast Live Oak Woodland**

This community is found on north slopes and in shaded ravines or canyon bottoms and is characterized by coast live oak (*Quercus agrifolia*), hollyleaf cherry (*Prunus illicifolia*), California bay laurel (*Umbellularia californica*), coffeeberry (*Rhamnus californica*) and poison oak (*Toxicodendron diversilobum*). Coast live oak is more tolerant of salt-laden fog than other oaks and thus can be found relatively near the ocean. This community is often found on the well-drained soils of coastal plains and protected bluffs. Groves are formed across valleys and along streams and intermittent watercourses. Live oaks, as their name suggests, are evergreen. Preferring permanent water, the deep taproots of live oaks can reach to the water table.

Well-developed oak woodlands can be found at Trippet Ranch in Topanga State Park, at Rocky Oaks, and in the canyon bottom of Las Virgenes Canyon. Characteristic wildlife includes acorn

woodpeckers, plain titmice and northern flickers, cooper's hawks, western screech owls, mule deer, gray foxes, ground squirrels, jackrabbits and a variety of bats.

► **Riparian Woodland**

Riparian woodlands occur along canyon and valley bottoms with perennial or intermittent streams in nutrient rich soils, or within the drainage of steep slopes. Of all the plant communities in the Santa Monica Mountains, the riparian community contains



Riparian Woodland (NPS photo).

the greatest species diversity. Also unlike other communities, riparian woodlands have multi-layered vegetation, with both an under and overstory. Dominant species may include arroyo willow (*Salix lasiolepis*), California black walnut (*Juglans californica*), sycamore (*Platanus racemosa*) Mexican elderberry (*Sambucus mexicana*), California bay laurel (*Umbellularia californica*) and mule fat (*Baccharis salicifolia*). Riparian woodland is one of the most endangered plant communities in California. It is estimated that less than 10 percent of the original 200,000 acres of riparian communities remain in California (NPS 1982a). Four kinds of riparian communities are easily identifiable in the Santa Monica Mountains.

Walnut riparian woodlands occur along streams and in pockets along west facing drainage ways, and on northeast facing slopes (sometimes not in streamside areas). Black walnuts often invade willow riparian areas. The non-riparian walnut woodlands are best developed in the eastern part of the Santa Monica Mountains on shale and north facing slopes.

Mule fat dominated riparian areas occur along intermittent streams, where flooding is frequent, or as an understory to sycamore woodlands.

Willow riparian areas precede a more diverse riparian community, such as sycamore woodlands. Willows are classic pioneers in riparian forests.

Sycamore riparian woodlands occur throughout the mountains. They are easily recognizable by the dominance of this species and a variety and abundance of other plant species, such as poison oak. A rich community, sycamore riparian woodlands are the most diverse riparian community in the Santa Monica Mountains.

Within the SMMNRA, there are approximately 35 separate watersheds, with more than 40 drainages that empty into the Pacific Ocean. Riparian woodlands may have

soils that retain moisture longer, with larger amounts of organic matter and clay than found in other Santa Monica Mountains plant communities.

Big Sycamore Canyon in Point Mugu State Park, Malibu Creek, or Medea Creek in Cheeseboro Canyon contain good examples of riparian woodland. Characteristic wildlife include American goldfinches, black phoebes, warbling vireos, song sparrows, belted kingfishers, raccoons, California and Pacific tree frogs and, in some perennial streams, steelhead trout.



Valley Oak Savanna (NPS photo).

■ Valley Oak Savanna

Valley oaks (*Quercus lobata*) reach the southernmost extension of their range in Malibu Creek State Park. Endemic to California, valley oaks were once widely distributed from the Sacramento and Pit River canyons, 500 miles south to the Santa Monica Mountains. These trees, which reach truly majestic proportions, originally spread over the native grasslands in the wide valleys of central and coastal California. Valley oaks reach ages of 400-600 years and may have trunks six or seven feet in diameter. They present a graceful appearance on the landscape, widely spaced with branches that may drape to touch the ground.

Over the last 150 years, valley oaks have succumbed to widespread agricultural and



residential development that has focused on their prime habitat – alluvial valleys. Although thousands of acres of valley oak savanna remain, they are vastly changed. The savanna or grassland understory was formerly comprised of dozens of species of native grasses and forbs, which blossomed in an array of wildflowers in the spring. Now the grassland understory is comprised mainly of alien European annual grasses, which have out-competed and crowded out the native species over the decades since they were introduced.

Where once a multi-layered composition of valley oaks of different ages existed, now only the large trees remain. Many years of non-seedling growth have resulted in low replenishment of young or medium aged trees to the valley oak savanna.

Aside from valley oaks, characteristic native grasses, which dominate valley oak savanna, include purple needlegrass (*Nassella pulchra*), and alien grasses such as wild oats (*Avena fatua*) and ripgut brome (*Bromus diandrus*) as well as black mustard (*Brassica nigra*). Wildflowers include mariposa lilies (*Calochortus catalinaea*) and coast goldfields (*Lasthenia chrysotoma*). Characteristic wildlife includes American kestrels, scrub jays, acorn woodpeckers, coyotes and mule deer.

► Valley Grassland

There are two types of grassland that occur in the Santa Monica Mountains: native perennial and alien annual grasslands. Perennial bunch grasses are considered to be the original native grassland of California, while annual grasses were those introduced by the European and Spanish settlers for their livestock. The golden rolling hills of California are largely a result of the introduction of these annual grasses, since bunch grasses often remain green even during summer drought.

Perennial bunch grasses differ from annual grasses in that they put much of

their energy during their first several years into establishing a well-developed root system that would sustain them through regular summer drought. Their roots penetrate deeply into the soil, providing nutrients and water and holding soil particles firmly in place. This decreases the erosive effects of wind and water. Unlike annual grasses, they don't produce seeds the first year, but as the years continue, produce an abundance of seed at maturity. The tufted parent increases in size every year.

More than 100 years of livestock have been grazing on California's former native perennial grassland, which has been converted to alien annual grassland. Native perennial grasslands historically covered nearly 20 percent of California, but today cover less than 0.1 percent. Today, approximately 18 million acres, or 17 percent of California, is considered valley grassland that contains both alien annual and native perennial species (Keeley 1990). The California Natural Diversity Database (CNDDDB) identified purple needlegrass grassland as a community needing priority monitoring and restoration. The CNDDDB considers grasslands with 10 percent or greater cover of purple needlegrass to be significant, adding that these should be protected as remnants of California prairie.

Characteristic wildlife includes turkey vultures, horned larks, western meadowlarks, long-tailed weasels and badgers.

► Freshwater Ponds and Lakes

In the Santa Monica Mountains, freshwater ponds and lakes are primarily artificial, but still form an important community type and provide valuable wildlife habitat. Among these are stock ponds at Rancho Sierra Vista, Rocky Oaks, Point Mugu, Palo Comado Canyon, Nicholas Flats, the Westlake and Las Virgenes Reservoirs, and Lakes Lindero and Sherwood, as well as many other small ponds. Characteristic plants include various



Freshwater Pond (NPS photo).

cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), and duckweed (*Lemna* spp.). Characteristic birds include red-winged blackbirds, ruddy ducks and American coots.

► **Rock Outcrops**

Innumerable cliffs and rock outcrops of sedimentary, metamorphic and volcanic origin dot the Santa Monica Mountains. These rocky outcrops, made colorful by a profusion of lichens, club moss and dudleyas, provide nest sites and perches for raptors and habitat for mammals such as the ringtail (*Bassariscus astutus*) and long-tailed weasel (*Mustela freneta*). Characteristic birds include prairie falcons, turkey vultures, canyon wrens and common ravens.

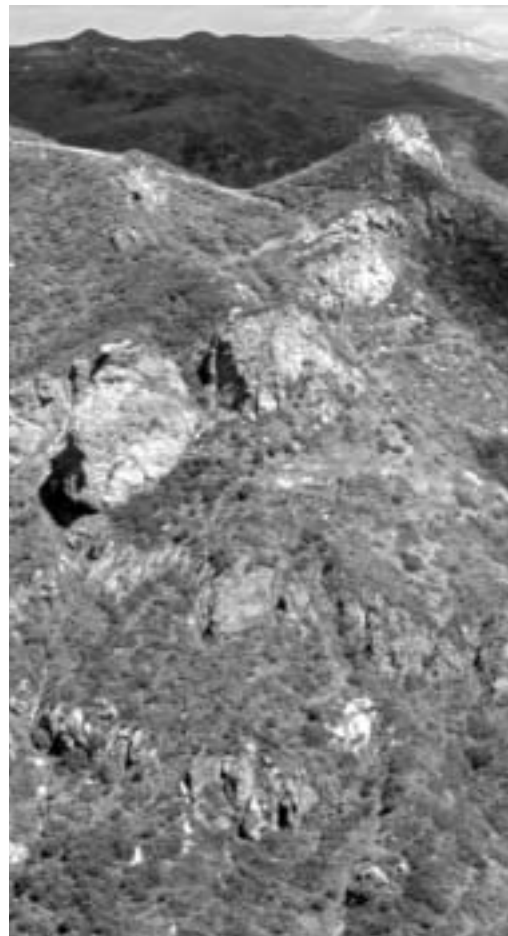
► **Suburban Development**

People would continue to live and work in the mountains as recreation area neighbors. As a result, the recreation area would always include areas of suburban and human-influenced habitat. Characteristic birds include house finches, mourning doves, great horned owls and northern mockingbirds.

Fire has been an especially important factor shaping ecosystems of the Santa Monica Mountains. Fire is a major factor controlling nutrient cycles and energy pathways. Through much of the past, fire has been a natural process, contributing to the

diversity, productivity and regeneration of ecosystems. The recreation area's vegetation and wildlife evolved over millions of years in partial response to naturally occurring fires. These fires, in combination with burnings by Native Americans during the last 12,000 years, shaped the landscape.

However, current fire regimes have been heavily affected by the proximity of the mountains to millions of people. All of the major fires since 1925 have been human caused – either by arson or accidental events (e.g. downed power poles, vehicle emissions, cigarettes tossed out car windows, etc.). In southern California brushlands, numbers of fires have increased and fire rotation intervals have decreased over the 20th century as population densities have increased (Keeley,



Rock Outcrops (NPS photo).



et al. 1999). Even accounting for burnings by Native Americans, it was likely that pre-historic fire frequency was lower and return intervals significantly longer. Fire has long been used as a tool to intentionally convert shrub lands to clear farmland and produce the grasslands more suitable for grazing livestock. Now, however, high fire frequencies are producing the same, now undesired, effect of converting native chaparral communities to non-native grasslands, as well as altering the native vegetation structure, and facilitating further invasion of non-native species – particularly exotic grasses.

WILDLIFE

The Santa Monica Mountains support an abundant wildlife community, which is reflective of the diversity of the vegetation within the SMMNRA boundary. More than 450 vertebrate species occur in the SMMNRA, including 50 mammals, 384 birds, and 36 reptiles and amphibians. The relatively intact wildlife populations of the mountains are especially impressive considering their proximity to one of the largest urban areas in the United States. The continued maintenance of wildlife populations in the Santa Monica Mountains is dependent on the ability of public and private land managers to ensure adequate habitat for the most sensitive species. Urban development within the mountains

continues to remove and fragment habitat available to wildlife, as it climbs up canyons, expands in pockets of low lying land, tops ridges, and encroaches on habitat adjacent to protected public land.

■ Mammals

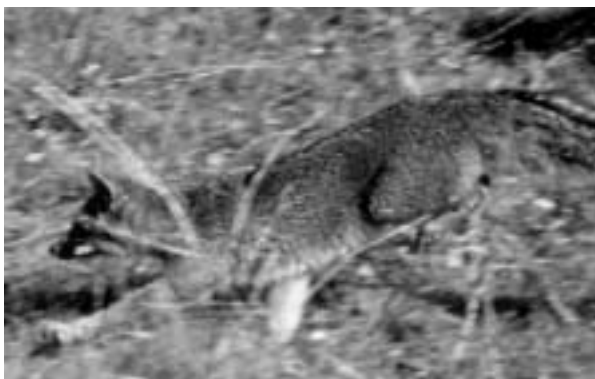
Mule deer (*Odocoileus hemionus californicus*) are the largest herbivores in the Santa Monica Mountains. Mule deer are found throughout the mountains in a variety of habitats. Their distribution is limited by the fluctuating availability of watercover and vegetation.

Lagomorphs, or rabbits, are represented by three species, including the brush rabbit (*Sylvilagus bachmani*), Audubon's cottontail (*Sylvilagus audubonii*) and the black-tailed jackrabbit (*Lepus californicus*). Collectively these species inhabit brushy areas and especially meadows and grasslands.

Rodents comprise the final segment of the herbivorous mammals of the Santa Monica Mountains. Common species include the California ground squirrel (*Spermophilus beechyi beechyi*), fox squirrel (*Sciurus niger*), deer mouse (*Peromyscus maniculatus*), dusky-footed woodrat (*Neotoma fuscipes*), Pacific kangaroo rat (*Dipodomys agilis*), and the pocket mouse (*Perognathus californicus*).

The Santa Monica Mountains still contain mountain lions (*Felis concolor*), although their continued ability to survive in the face of large-scale habitat fragmentation and destruction is uncertain. It is likely that their persistence in the mountains would depend upon their capability of dispersing to and from other habitat areas beyond the Santa Monica Mountains.

Other predators include bobcats (*Lynx rufus*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), badgers (*Taxidea taxus*), ringtails (*Bassariscus astutus*), raccoons (*Procyon lotor*), spotted and striped skunks (*Mephitis mephitis* and *Spilogale putorius*), and long-tailed weasels (*Mustela frenata*). In general, the survival of carnivores would



Gray Fox (NPS photo).



California Sea Lion (NPS photo).

depend on their ability to survive amid increased developments and the extent to which these species can disperse between open space areas and parklands.

Marine mammals that occur within the boundary of the SMMNRA are limited to harbor seals (*Phoca vitulina*), and California sea lions (*Zalophus californianus*) which breed in Mugu Lagoon. Other marine mammals that can be readily observed from within the boundary include migrating California gray whales (*Eschrichtius robustus*) and bottlenosed dolphins (*Tursiops truncatus*).

► **Birds**

Located along the Pacific flyway, more than 384 species of birds (including vagrants) may be found in the mountains. In Malibu Lagoon alone, more than 262 species have been recorded. Of the total number of birds that may be found within the recreation area, approximately one-third, or 117, breed here. Thirteen of these breeders are raptors, which is an unusually high concentration. Sheer high cliffs of sedimentary and volcanic origin provide excellent nesting areas. Historically, California condors, bald eagles and peregrine

falcons nested here. Currently, golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks (*Buteo lineatus*), Cooper's hawks (*Accipiter cooperii*), and sharp-shinned hawks (*Accipiter striatus*) nest here. Prairie falcons (*Falco mexicanus*), American kestrels (*Falco sparverius*), black-shouldered kites (*Elanus leuairus*), barn owls (*Tyto alba*), great horned owls (*Bubo virginianus*), western screech owls (*Otus kennicottii*), burrowing owls (*Athene cunicularia*), short-eared owls (*Asio flammeus*) and turkey vultures (*Cathartes aura*) also nest within the recreation area.

► **Reptiles**

Twenty-five species of reptiles inhabit the Santa Monica Mountains, including two turtle (one introduced), seven lizard and 16 snake species. The western pond turtle (*Clemmys marmorata pallida*) is considered extremely rare. Common lizards include western fence lizards (*Sceloporus occidentalis longipes*), side-blotched lizards (*Uta stansburiana elegans*), and alligator lizards (*Elgaria multicarinata webbi*). The coastal horned lizard (*Phrynosoma coronatum frontale*),



a California species of special concern, is also regularly observed in the recreation area. Common snakes include southern Pacific rattlesnakes (*Crotalus viridis helleri*), gopher snakes (*Pituophis melanoiecus annectens*), and California striped racers (*Masticophis lateralis lateralis*). Very little information is available about the distribution and status of many reptile species in the SMMNRA. For example, two-striped garter snakes (*Thamnophis couchi hammondi*), coastal western whiptail lizards (*Cnemidophorus tigris multiscutatus*), San Diego mountain kingsnakes (*Lampropeltus zonata pulchra*), and silvery legless lizards (*Anniella pulchra pulchra*) are believed to be in decline or very rare.

■ Amphibians

The Santa Monica Mountains contain habitat for 11 species of amphibians, including five salamanders and six frogs or toads (two introduced). Two other species often listed for the Santa Monica Mountains, the arroyo toad (*Bufo microscaphus californicus*) and the western spadefoot toad (*Scaphiopus hammondi*), occur nearby but no historical records exist for their occurrence and no populations have been found in the SMMNRA. Until recently the California red-legged frog (*Rana aurora draytoni*) was considered extirpated. The California toad (*Bufo boreas halophilus*) and Pacific treefrog (*Hyla regilla*) are relatively common. Other amphibian species are suffering declines, including California newts (*Taricha torosa*) and California treefrogs (*Hyla cadaverina*), as a result of predation by exotic species, habitat loss, and likely other factors (e.g. U.V. radiation). In general, the decline of amphibian populations in the Santa Monica Mountains has become a priority concern.

■ Fish

A variety of native and introduced fish occur in the waters of the Santa Monica

Mountains. Of significance are at least three spawning populations of the endangered steelhead trout (*Onchorynchus mykiss*) and one spawning population of Pacific lamprey (*Lampetra tridentata*), as well as several locations where California grunion (*Leuesthes tenuis*) spawn. Arroyo chub occur in the slow moving waters of Malibu Creek and a variety of introduced fish, such as largemouth bass, bluegill and goldfish, occur in freshwater streams up and downstream from recreational lakes and golf course such as Malibu Lake and the Malibu Country Club.

The lagoons provide habitat to a number of migratory water birds, and supports one of the southernmost steelhead trout runs in the U.S. Besides the reintroduced tidewater goby, and resident steelhead, native fish in Malibu Lagoon include killifish (*Fundulus parvipinnis*), arrow goby (*Clevelandia ios*), staghorn sculpin (*Leptocottus armatus*), long-jawed mudsucker (*Gillichthys mirabilis*), opaleye (*Girella nigricans*), topsmelt (*Atherinops affinis*), diamond turbot (*Hypsopsetta guttulata*), northern anchovy (*Engraulis mordax*), California halibut (*Paralichthys californicus*), Pacific lamprey (*Lampetra tridentata*), queenfish (*Seriophus politus*), bay pipefish (*Syngnathus leptohinchus*), starry flounder (*Platichthys stellatus*), kelpfish (*Gibbonsia monterivensis*), and serranid (*Paralabrax* sp.) (Manion 1993; Manion and Dillingham 1989).

■ Insects

Information on insects and their relationships to other organisms in the Santa Monica Mountains is very limited. The diversity and abundance of these organisms is certainly quite large. Aside from references by Emmel and Emmel (1973) and Hogue (1974, 1993), very little comprehensive information on insects exists for the mountains. Partial surveys and species lists exist from various sources (e.g. Resource Conservation District of the Santa Monica Mountains,



docents from Charmlee County Park, etc.). However, few, if any, systematic surveys have been completed.

HABITAT CONNECTIVITY

Perhaps the greatest threat to natural resource preservation in the Santa Monica Mountains National Recreation Area is the loss of habitat connectivity from increased development and urban encroachment. Natural areas that *do* remain in the recreation area are becoming subdivided into smaller patches and housing tracts. Commercial developments and roadways are further compromising connections between these patches. This fragmentation and connectivity loss could isolate plant and animal populations, reducing their numbers, increasing their susceptibility to environmental change, and exposing them to potential genetic deterioration. For some species, particularly larger animals with low population densities and wide ranges, these consequences could be severe and result in their extinction from formerly occupied habitats. For example, in the Santa Monica Mountains, habitat loss, fragmentation, and loss of connectivity threaten the survival of bobcats, gray foxes, and badgers. The situation is especially serious for mountain lions, where persistence in the recreation area could depend on their ability to disperse to and from the Santa Monica Mountains from surrounding open space areas and mountain ranges.

To address this concern, the National Park Service is actively involved in identifying critical habitats to ensure that sufficient open space remains in the recreation area and that these areas are connected with habitat linkages or wildlife movement corridors (refer to Figure 12). Areas of particular concern include protecting east-west connections within the Santa Monica Mountains to link already established core habitats, such as Point Mugu State Park/Circle

X Ranch, Zuma and Trancas Canyons, Malibu Creek State Park, and Topanga State Park. In addition, north-south linkages between the Santa Monica Mountains and Simi Hills are also vital.

Highway 101 and developments along this eight- to 10-lane freeway have eliminated nearly all options for north-south connections, but two critically important linkage areas remain. The first, in the central Santa Monica Mountains, connects Malibu Creek State Park south of the freeway to Cheeseboro and Palo Comado Canyons to the north. The best option for a viable connection in this area is through Liberty Canyon. Additional routes to further safeguard this link may exist near Las Virgenes Creek, although extensive development has constrained this option.

The second critical north-south linkage area occurs at the western end of the Santa Monica Mountains, along the Conejo grade. Connectivity across Highway 101 in this location has the advantage of linking two relatively undeveloped areas, including undeveloped land north of the freeway in Hill Canyon and Wildwood Park and south of the freeway on Conejo Mountain. However, proposed and ongoing development and limited opportunities for animals to traverse Highway 101 threaten this area, too.

Beyond the Santa Monica Mountains and Simi Hills, connectivity to the Santa Susana Mountains would be crucial for larger animals like mountain lions. In this case, linkage opportunities are also limited. The most likely connection between the Simi Hills and Santa Susana Mountains occurs at Santa Susana Pass, east of Simi Valley and along Highway 118. Another potential connection route is located further west, in the vicinity of the Tierra Rejada Valley and just east of Moorpark. Ongoing development and existing roadways (including highways 23 and 118) threaten the western linkage.



Ultimately, connectivity from the Santa Monica Mountains and Simi Hills to the Santa Susana Mountains, Los Padres National Forest, and Angeles National Forest would be necessary to ensure the survival of large mammals in the recreation area. The keys now are to identify where these connections occur, determine if and how they are used by wildlife, and to protect the linkages while opportunities remain. In addition, restoration activities or other improvements to facilitate wildlife movement across freeways or through developments may be necessary. Currently, the National Park Service and other research cooperators are conducting research to identify critical linkage areas and to determine the characteristics of sites that promote their use by wildlife.

Although habitat linkages and wildlife movement corridors would be critical to ensure wildlife survival in the Santa Monica Mountains, the primary need is to protect sufficient habitat for wildlife now. Linkages and corridors serve no wildlife protection purposes unless they connect large, contiguous blocks of protected open space. Without the core habitats and sufficient areas for foraging, breeding and maintaining healthy populations would not occur. In evaluating connectivity needs and potential linkage areas, it is critical to identify which core areas the linkage would serve and which species would utilize and benefit from the connectivity. While some habitat linkages and wildlife movement corridors may be useful for some species they may be less valuable or important for others.

THREATENED AND ENDANGERED SPECIES

More than twenty plant and animal species with potential to occur within the Santa Monica Mountains National Recreation Area are federally listed as threatened or endangered. Four additional state-listed species occur within the Santa Monica Mountains. Another 46 animal and 11 plant

species are federal or state species of concern. In addition, a number of other plant and animal species are considered rare or locally threatened. A comprehensive list of these species is provided in the following tables (Tables 12, 13 and 14).

WETLANDS

From Mugu Lagoon to the Santa Monica Pier, the SMMNRA includes 41 miles of Pacific coastline. Overall, the shoreline of the SMMNRA receives some of the most intense recreational use in the United States and is an extremely popular summer destination for residents of Ventura and Los Angeles Counties, as well as visitors from all parts of the United States and other countries. Despite sections of intense use and development, the coastal portion of the SMMNRA has retained important natural resources. These include two lagoons that provide habitat for a variety of rare or threatened species, spawning grounds for grunion (*Leuresthes tenuis*), and numerous locations where the progression in coastal plant communities can be clearly delineated. Although not included within the SMMNRA boundary, the near shore habitats are also diverse in structure and species composition, and include rock reefs, tide pools, kelp beds, submarine canyons and subtidal sand flats. In 1979, the State Water Resources Control Board designated the coastal area from Laguna Point (Ventura County) to Latigo Point (Los Angeles County) as an "Area of Special Biological Significance" for its outstanding and diverse biotic communities and exemplary water quality. Due to the Mediterranean climate, wetlands and riparian habitats play a significant role in maintaining the natural ecological processes of the Santa Monica Mountains. To date, the U.S. Fish and Wildlife Service has provided a rough estimate (National Wetlands Inventory) of the extent of wetlands and riparian habitats in the mountains. Based on 1974, 1:80,000



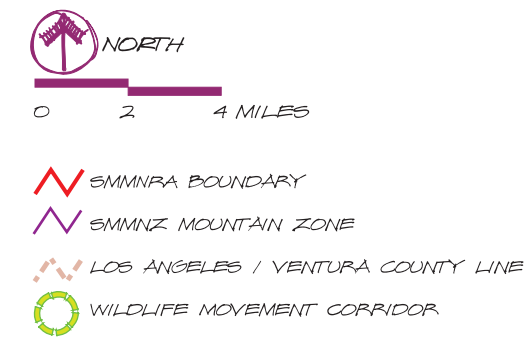



Figure 12:
**WILDLIFE
CORRIDORS**

**SANTA MONICA MOUNTAINS
NATIONAL RECREATION AREA
CALIFORNIA**

INCLUDES UNITS OF NPS, CALIFORNIA STATE PARKS,
AND THE SANTA MONICA MOUNTAINS CONSERVANCY

United States Department of the Interior • National Park Service
SAMO • April 2002 • 638 • 20074


Table 12

<div>  <div> RARE, THREATENED, OR ENDANGERED ANIMALS Potentially Occurring in the SMMNRA </div> </div>				
SPECIES	COMMON NAME	FEDERAL*	STATE*	PARK*
Mammals				
<i>Antrozous pallidus</i>	Pallid Bat	SC	CSC	–
<i>Euderma maculatum</i>	Spotted Bat	SC	CSC	–
<i>Eumops perotis californicus</i>	Greater Western Mastiff Bat	SC	CSC	–
<i>Macrotus californicus</i>	California Leaf-nosed Bat	SC	CSC	–
<i>Myotis lucifugus occultus</i>	Occult Little Brown Bat	SC	CSC	–
<i>Plecotus townsendii townsendii</i>	Pacific Western Big-eared Bat	SC	CSC	–
<i>Sorex ornatus salicornicus</i>	Salt Marsh Ornate Shrew	SC	CSC	–
<i>Reithrodontomys megalotus limicola</i>	Southern Marsh Harvest Mouse	(C3)	–	–
<i>Lasirus cineris</i>	Hoary Bat	–	–	PSC
<i>Taxidea taxus</i>	American Badger	–	–	PSC
<i>Felis concolor</i>	Mountain Lion	–	–	PSC
<i>Bassariscus astutus</i>	Ringtail	–	–	PSC
<i>Mustela frenata</i>	Longtail Weasel	–	–	PSC
<i>Neotoma lepida intermedia</i>	Coastal Desert Woodrat	–	–	PSC
Birds				
<i>Pelicanus occidentalis californicus</i>	Brown Pelican	E	E	–
<i>Falco peregrinus anatum</i>	Peregrine Falcon	–	E	–
<i>Rallus longirostris levipes</i>	Light-footed Clapper Rail	E	E	–
<i>Sterna antillarum browni</i>	California Least Tern	E	E	–
<i>Empidonax traillii extrimus</i>	Southwestern Willow Flycatcher	E	E	–
<i>Vireo belli pusillus</i>	Least's Bell Vireo	E	E	–
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	E	–
<i>Charadrius alexandrius nivosus</i>	Western Snowy Plover	T	CSC	–
<i>Poliopitila Californica</i>	California Gnatcatcher	T	CSC	–
<i>Passerculus sandwichensis beldingi</i>	Belding's Savannah Sparrow	SC	E	–
<i>Ixobrychus exilis hersperis</i>	Western Least Bittern	SC	CSC	–
<i>Sterna elegans</i>	Elegant Tern	SC	CSC	–
<i>Eremophila alpestris actia</i>	California Horned Lark	SC	CSC	–
<i>Campylorhynchus brunneicapillus cousei</i>	San Diego (Coastal) Cactus Wren	SC	CSC	–
<i>Lanius ludovicianus</i>	Loggerhead Shrike	SC	CSC	–
<i>Agelaius tricolor</i>	Tri-colored Blackbird	SC	CSC	–
<i>Aimophial ruficeps canescens</i>	Southern California Rufous-crowned Sparrow	SC	CSC	–
<i>Oreotyx pictus</i>	Mountain Quail	SC	–	–
<i>Numenius americanus</i>	Long-billed Curlew	–	CSC	–
<i>Riparia riparia</i>	Bank Swallow	–	T	–
*STATUS CODES:				
Federal:		State:	Park:	
E = Federally Endangered		E = State Endangered	PSC = Park Species of Concern	
T = Federally Threatened		T = State Threatened	LE = Believed Locally Extinct/Extirpated	
PE = Proposed Endangered		CE = State Candidate Endangered		
PT = Proposed Threatened		CT = State Candidate Threatened		
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(Former Category 1 and 2 Species)				
(C3) = Former Federal C3 Species				



<div><div>RARE, THREATENED, OR ENDANGERED ANIMALS Potentially Occurring in the SMMNRA</div></div>					
SPECIES	COMMON NAME	FEDERAL*	STATE*	PARK*	
Birds (cont'd)					
<i>Aquila chrysaetos</i>	Golden Eagle	–	CSC	–	
<i>Accipiter cooperii</i>	Cooper's Hawk	–	CSC	–	
<i>Circus cyaneus</i>	Northern Harrier	–	CSC	–	
<i>Pandion haliaetus</i>	Osprey	–	CSC	–	
<i>Falco columabarius</i>	Merlin	–	CSC	–	
<i>Falco mexicanus</i>	Prairie Falcon	–	CSC	–	
<i>Asio otus</i>	Long-eared owl	–	CSC	–	
<i>Athene cuninularia</i>	Burrowing owl	–	CSC	–	
<i>Dendrocia petechia</i>	Yellow Warbler	–	CSC	–	
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	–	–	PSC	
<i>Accipiter striatus</i>	Sharp-shinned Hawk	–	–	PSC	
<i>Buteo lineatus</i>	Red-shouldered Hawk	–	–	PSC	
<i>Buteo regalis</i>	Ferruginous Hawk	–	–	PSC	
<i>Elanus Caeruleus</i>	White-Tailed Kite	–	–	PSC	
<i>Porzana carolina</i>	Sora Rail	–	–	PSC	
<i>Charadrius montanus</i>	Mountain Plover	–	–	PSC	
<i>Amphispiza belli</i>	Bell's Sage Sparrow	–	–	PSC	
<i>Icteria virens</i>	Yellow-breasted Chat	–	–	PSC	
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	–	–	PSC	
<i>Gavia immer</i>	Common Loon	–	–	PSC	
<i>Plegadis chihi</i>	White-faced Ibis	–	–	PSC	
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	–	–	PSC	
<i>Cathartes aura</i>	Turkey Vulture	–	–	PSC	
<i>Buteo jamaicensis</i>	Red-tailed Hawk	–	–	PSC	
<i>Falco sparverius</i>	American Kestrel	–	–	PSC	
<i>Tyto alba</i>	Barn Owl	–	–	PSC	
<i>Bubo virginianus</i>	Great-horned Owl	–	–	PSC	
<i>Otus kennicottii</i>	Western Screech Owl	–	–	PSC	
<i>Asio flammeus</i>	Short-eared Owl	–	–	PSC	
Reptiles					
<i>Clemmy's mamorata pallida</i>	Southwestern Pond Turtle	SC	CSC	–	
<i>Phrynosoma coronatum</i>	Coast Horned Lizard	SC	CSC	–	
<i>Lampropeltus zonata pulchra</i>	San Diego Mountain Kingsnake	SC	CSC	–	
<i>Salvadora hexalepis vigultea</i>	Coast Patch-nosed Snake	SC	CSC	–	
<i>Cnemidophorus tigris multiscutatus</i>	Coastal Western Whiptail	SC	–	–	
*STATUS CODES:					
Federal:		State:		Park:	
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(C3) = Former Federal C3 Species					

(cont'd) **Table 12**

<div style="display: flex; align-items: center;">  <div> <p style="text-align: center;">RARE, THREATENED, OR ENDANGERED ANIMALS Potentially Occurring in the SMMNRA</p> </div> </div>				
SPECIES	COMMON NAME	FEDERAL*	STATE*	PARK*
Reptiles (cont'd)				
<i>Diadophis punctatus modestus</i>	San Bernardino Ringneck Snake	SC	–	–
<i>Thamnophis hammondi</i>	Two-striped Garter Snake	SC	–	–
<i>Anniella pulchra pulchra</i>	Silvery Legless Lizard	–	CSC	–
<i>Hypsiglena torquata</i>	Night Snake	–	–	PSC
<i>Trimorphodon biscutatus vandenburghi</i>	California Lyre Snake	–	–	PSC
<i>Leptotyphlops humilis</i>	Western Blind Snake	–	–	PSC
<i>Eumeces skiltonianus</i>	Western Skink	–	–	PSC
Amphibians				
<i>Rana aurora draytoni</i>	California Red-legged Frog	T	CSC	–
<i>Taricha torosa torosa</i>	Coast Range Newt	–	CSC	–
<i>Ensatina eschscholtzii</i>	Ensatina	–	–	PSC
<i>Aneides lugubris</i>	Arboreal Salamander	–	–	PSC
<i>Hyla cadaverina</i>	California Tree Frog	–	–	PSC
Fishes				
<i>Eucyclogobius newberryi</i>	Tidewater Goby	E	CT	–
<i>Oncorhynchus mykiss</i>	Southern California Steelhead Trout	E	–	–
<i>Gila orcutti</i>	Arroyo Chub	–	–	PSC
<i>Lampetra tridentata</i>	Pacific Lamprey	–	–	PSC
Invertebrates				
<i>Euphydryas editha quino</i>	Wright's Checkerspot Butterfly	E	–	LE
<i>Streptocephalus woottoni</i>	Riverside Fairy Shrimp	E	–	–
<i>Lycaena arota nubila</i>	Clouded Tailed Copper Butterfly	SC	–	–
<i>Panoquina errans</i>	Salt Marsh Skipper Butterfly	SC	–	–
<i>Satyrrium auretorum fumosum</i>	Santa Monica Mtns Hairstreak Butterfly	SC	–	–
<i>Brennania belkini</i>	Belkins Dune Tabanid Fly	SC	–	–
<i>Neduba longipennis</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Neduba diminutiva dactyla</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Neduba diminutiva malibu</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Neduba morsei costalis</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Neduba morsei curtatus</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Neduba morsei tectinota</i>	Santa Monica Shieldback Katydid	SC	–	–
<i>Proceratium californicum</i>	Valley Oak Ant	SC	–	–
<i>Speyeria callippe comstocki</i>	Comstock's Fritillary Butterfly	–	–	PSC
<i>Lycaena gorgon</i>	Gorgon Copper Butterfly	–	–	PSC
*STATUS CODES:				
<div style="display: flex; justify-content: space-between;"> <div> <p>Federal:</p> <p>E = Federally Endangered</p> <p>T = Federally Threatened</p> <p>PE = Proposed Endangered</p> <p>PT = Proposed Threatened</p> <p>SC = Federal Species of Concern</p> <p>(Former Category 1 and 2 Species)</p> <p>(C3) = Former Federal C3 Species</p> </div> <div> <p>State:</p> <p>E = State Endangered</p> <p>T = State Threatened</p> <p>CE = State Candidate Endangered</p> <p>CT = State Candidate Threatened</p> <p>CSC = California Species of Concern</p> </div> <div> <p>Park:</p> <p>PSC = Park Species of Concern</p> <p>LE = Believed Locally Extinct/Extirpated</p> </div> </div>				



(cont'd) **Table 12**

RARE, THREATENED, OR ENDANGERED ANIMALS Potentially Occurring in the SMMNRA				
SPECIES	COMMON NAME	FEDERAL*	STATE*	PARK*
Invertebrates (cont'd)				
<i>Coleus globosus</i>	Globose Dune Beetle	–	–	PSC
<i>Melanoplus obespolus</i>	(Grasshopper)	–	–	PSC
<i>Ceuthophilus hesperus eino</i>	(Camel Cricket)	–	–	PSC
<i>Arenivaga</i> spp.	(Sand Cockroaches)	–	–	PSC
<i>Trimerotropis occidentaloidea</i>	Santa Monica Mountains Grasshopper	–	–	PSC
<i>Timena monikensis</i>	(Walkingstick)	–	–	PSC
*STATUS CODES:				
Federal:		State:		Park:
E = Federally Endangered		E = State Endangered		PSC = Park Species of Concern
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PE = Proposed Endangered		CE = State Candidate Endangered		
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SC = Federal Species of Concern (Former Category 1 and 2 Species)		CSC = California Species of Concern		
(C3) = Former Federal C3 Species				


aerial photography, the USF&WS delineated wetlands on the 14 USGS 7.5 minutes maps that encompass the park. Freshwater wetlands typically occur in canyon bottoms along perennial and intermittent streams and in association with man-made ponds. Field checks have not been made against these maps. Furthermore, the information depicted on these maps is of such a gross scale it can only be used for large-scale analysis of land use practices. With the rapid, lot by lot, development of the mountains, more definitive information is needed. The park is developing GIS maps that would allow public agencies to quickly determine if significant resources exist on individual parcels of private land. A detailed wetland and riparian vegetation inventory is needed to support this effort in order to address specific threats to park resources. SMMNRA has recognized this need as a priority and has procured funding to begin monitoring in Fiscal Year 2001.

The SMMNRA contains two existing lagoons with perennial streams and three

with intermittent streams. The largest of the lagoons, Mugu Lagoon, is owned by the U.S. Navy and is the largest relatively undisturbed salt marsh in southern California. The other lagoon, Malibu Lagoon, is the recipient of 105 square miles of drainage within the SMMNRA. Degraded estuarine areas periodically occur in Topanga Canyon, Trancas Creek and Zuma Creek, depending on the seasonal water flows.

In 1996, the California Water Quality Assessment attributed non-point-source pollution to more than 80 percent of impairment problems for coastal lagoons, harbors and wetlands. The creek flowing into Mugu Lagoon is Calleguas Creek (the lagoon is located at the extreme south end of Calleguas Creek). Therefore, the total area of the watershed is 343 square miles, about 30 miles long and 14 miles wide. It is located in southern Ventura County with a small portion in Los Angeles County. Only a small part of this watershed is within the SMMNRA. Calleguas Creek is the major drainage in the watershed and its tributaries

Table 13



RARE, THREATENED, OR ENDANGERED PLANTS
Potentially Occurring in the SMMNRA

Species	Common Name	Federal*	State*	Park*	Regional*
<i>Cordylanthus maritimus</i> ssp. <i>Maritimus</i>	salt marsh bird's-beak	E	E	1B	–
<i>Pentachaeta lyonii</i> ¹	Lyon's pentacheata	E	E	1B	–
<i>Astragalus brauntonii</i> ²	Braunton's milk-vetch	E	–	1B	–
<i>Astragalus tener</i> var. <i>titi</i>	Coastal dunes milk-vetch	PE	E	1B	LE
<i>Astragalus pycnostachyus</i> var. <i>lanosissimus</i>	Ventura marsh milk-vetch	SC	CE	1A ⁴	–
<i>Dudleya cymosa</i> ssp. <i>Marcescens</i> ¹	Marcescent dudleya	T	R	1B	–
<i>Dudleya cymosa</i> ssp. <i>Ovatifolia</i> ²	Santa Monica Mtns. Dudleya	T	–	1B	–
<i>Dudleya cymosa</i> ssp. <i>Ovatifolia form agourensis</i> ¹	(Not recognized as a separate taxon)				
<i>Dudleya abramsii</i> ssp. <i>Parva</i> ¹	Conejo dudleya	T	–	1B	–
<i>Dudleya verityi</i> ¹	Verity's dudleya	T	–	1B	–
<i>Dithyrea maritima</i>	beach spectaclepod	SC	T	1B	LE
<i>Eriogonum crocatum</i> ¹	Conejo buckwheat	SC	R	1B	–
<i>Hemizonia minthornii</i> ¹	Santa Susana tarplant	SC	R	1B	–
<i>Calochortus plummerae</i>	Plummer's mariposa lily	SC	–	1B	–
<i>Delphinium parryi</i> ssp. <i>Blochmaniae</i>	dune larkspur	SC	–	1B	–
<i>Dudleya blochmaniae</i> ssp. <i>Blochmaniae</i>	Blochman's dudleya	SC	–	1B	–
<i>Dudleya multicaulis</i>	many-stemmed dudleya	SC	–	1B	–
<i>Lasthenia glabrata</i> var. <i>coulteri</i>	Coulter's goldfields	SC	–	1B	–
<i>Chorizanthe parryi</i> var. <i>fernandina</i>	San Fernando Valley spineflower	SC	–	1A ⁴	–
<i>Chorizanthe parryi</i> var. <i>parryi</i>	Parry's Spineflower	SC	–	3	–
<i>Nolina cismontana</i>	California beargrass	SC	–	–	–
<i>Atriplex coulteri</i>	Coulter's saltbush	–	–	1B	–
<i>Muhlenbergia californica</i>	California muhly	–	–	1B	LE
<i>Nama stenocarpum</i>	mud nama	–	–	2	–
<i>Senecio aphanactis</i>	rayless ragwort	–	–	2	–
<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Sonoran maiden fern	–	–	2	–
<i>Camissonia lewisii</i>	Lewis's evening-primrose	–	–	3	–
<i>Hordeum intercedens</i>	Vernal barley	–	–	3	–
<i>Abronia maritima</i>	red sand-verbena	–	–	4	–
<i>Baccharis plummerae</i> ssp. <i>Plummerae</i>	Plummer's baccharis	–	–	4	–
<i>Boykinia rotundifolia</i>	round-leaved boykinia	–	–	4	–
<i>Calandrinia breweri</i>	Brewer's calandrinia	–	–	4	–
<i>Calandrinia maritima</i>	Seaside calandrinia	–	–	4	–

*STATUS CODES:

Federal:	State:	Park:
E = Endangered	E = Endangered	LE = Believed Locally Extirpated
T = Threatened	T = Threatened	
PE = Proposed Endangered	R = Rare	
SC = Species of Concern	CE = Candidate Endangered	

CNPS Status Codes:

1A = Presumed extinct in CA	2 = Rare of endangered in California, more common elsewhere
1B = Rare of endangered in California or elsewhere	3 = Plants for which we need more information – Review List
	4 = Plants of limited distribution – Watch List

¹ Endemic to the Santa Monica Mountains and Simi Hills area


² Major occurrence in SMM-SH area, there are a few occurrences outside area

³ Only mainland occurrence

⁴ Formerly presumed extinct. A population was discovered in 1998/98



(cont'd) **Table 13**



RARE, THREATENED, OR ENDANGERED PLANTS

Potentially Occurring in the SMMNRA

Species	Common Name	Federal*	State*	Park*	Regional*
<i>Calochortus catalinae</i>	Catalina mariposa lily	–	–	4	–
<i>Cercocarpus betuloides</i> var. <i>blancheae</i> ³	island mountain-mahogany	–	–	4	–
<i>Chamaebatia australis</i>	Southern mountain misery	–	–	4	–
<i>Dichondra occidentalis</i>	Western dichondra	–	–	4	–
<i>Erysimum insulare</i> ssp. <i>Suffrutescens</i>	Suffrutescent wallflower	–	–	4	–
<i>Galium cliftonsmithii</i>	Santa Barbara bedstraw	–	–	4	–
<i>Juglans californica</i> var. <i>californica</i>	Southern California black walnut	–	–	4	–
<i>Juncus acutus</i> ssp. <i>Leopoldii</i>	Southwestern spiny rush	–	–	4	–
<i>Lepechinia fragrans</i>	Fragrant pitcher sage	–	–	4	–
<i>Lilium humboldtii</i> ssp. <i>Ocellatum</i>	Humbolt lily	–	–	4	–
<i>Mucronaea californica</i>	California spineflower	–	–	4	LE
<i>Polygala cornuta</i> var. <i>fishiae</i>	Fish's milkwort	–	–	4	–
<i>Suaeda esteroa</i>	Estuary seablite	–	–	4	–
<i>Baccharis malibuensis</i> ¹	Malibu baccharis	–	–	–	–

*STATUS CODES:

Federal:

E = Endangered

T = Threatened

PE = Proposed Endangered

SC = Species of Concern

State:

E = Endangered

T = Threatened

R = Rare

CE = Candidate Endangered

Park:

LE = Believed Locally Extirpated

CNPS Status Codes:

1A = Presumed extinct in CA

1B = Rare of endangered in California or elsewhere

2 = Rare of endangered in California, more common elsewhere

3 = Plants for which we need more information – Review List

4 = Plants of limited distribution – Watch List

¹ Endemic to the Santa Monica Mountains and Simi Hills area

² Major occurrence in SMM-SH area, there are a few occurrences outside area

³ Only mainland occurrence

⁴ Formerly presumed extinct. A population was discovered in 1998/98

drain an area of 343 square miles from 37 subwatersheds. The lagoon is a vital stop on the Pacific Flyway, a nursery ground for many marine fish and mammals, and is also a vital habitat for several threatened and endangered species. Some of these include the California least tern, light-footed clapper rail, Belding's savanna sparrow, and the tidewater goby. Although Mugu Lagoon has not been affected as much as other lagoons and estuaries in southern California, it has not been left unaltered. The effects of agriculture, urbanization and past base construction by the U.S. Navy have resulted in significant

changes and loss of habitat. Security and operating zones are the principal reasons why the lagoon has thus far been preserved as well as it is.

The estuarine wetlands of Malibu Lagoon and salt marsh are estimated to cover 58 acres. There have been many alterations to the lagoon, from stream channelization to bringing in fill to construct baseball fields. Disturbance by humans, off-road vehicles, horses, and domestic pets are ongoing problems. The large watershed to the lagoon contributes a number of pollutants. In the highly urbanized parts of the watershed, non-

point-source pollution comes from runoff of roads and other impervious surfaces such as roofs, parking lots, driveways and sidewalks. The domestic use of water requires the importation of approximately 17,000 acre-feet of water per year. Some of this wastewater is treated at the Tapia Water Reclamation Facility, and either discharged to Malibu

Creek or sold for landscape irrigation. Between October and June, five to 10 million gallons per day are discharged to the creek. This increased amount of water in a stream poses major problems to the flora and fauna of the lagoon. When the lagoon mouth is closed, incoming water tends to pond within the system, creating a more freshwater

Table 14


 PLANT SPECIES UNCOMMON IN THE SMMNRA But Common Elsewhere	
Species	Common Name
<i>Amorpha californica</i> var. <i>californica</i>	false indigo
<i>Brodiaea jolonensis</i>	wild brodiaea
<i>Camissonia boothii</i> ssp. <i>Decorticans</i>	shredding evening primrose
<i>Carex globosa</i>	sedge
<i>Carex spissa</i>	sedge
<i>Cheilanthes cooperae</i>	Cooper's lace fern
<i>Cheilanthes covillei</i>	Coville's lace fern
<i>Cheilanthes newberryi</i>	lace fern
<i>Collinsia parryi</i>	blue-eyed Mary
<i>Eriogonum angulosum</i>	buckwheat
<i>Eriogonum wrightii</i> var. <i>membranaceum</i>	Wright's buckwheat
<i>Juncus rugulosus</i>	wrinkled rush
<i>Juniperus californica</i>	California juniper
<i>Koeleria macrantha</i> [K. <i>cristata</i>]	Junegrass
<i>Lewisia rediviva</i>	bitter root
<i>Linanthus pygmaeus</i> (ssp.?)	pygmy linanthus
<i>Notholaena californica</i>	California cloak fern
<i>Opuntia basilaris</i> var. <i>basilaris</i>	beavertail cactus
<i>Orobanche uniflora</i>	naked broom-rape
<i>Quercus douglasii</i>	blue oak
<i>Salix goodingii</i>	Gooding's black willow
<i>Sarcostemma cynanchoides</i> ssp. <i>Hartwegii</i>	climbing milkweed
<i>Silene verecunda</i> ssp. <i>Platyota</i>	Dolores campion
<i>Stanleya pinnata</i>	prince's plume
<i>Woodwardia fimbriata</i>	giant chain fern



Table 15

PALEONTOLOGIC SENSITIVITY OF ROCK FORMATIONS IN THE SMMNRA	
ROCK TYPE/FORMATION	SENSITIVITY
Igneous Rocks*	None to Low
All Formations	
Metamorphic Rocks	Low to None
All Formations	
Sedimentary Rocks	Moderate to High
Chatsworth Formation	High
Trabuco Formation	Moderate
Tuna Canyon Formation	High
Martinez (Coal Canyon) Formation	High
Sespe Formation	Moderate
Vaqueros Formation	High
Llajas Formation	High
Topanga Formation	High
Aquagene Tuffs of the Conejo Volcanics (correlative with the Zuma Formation)	Moderate
Calabasas Formation	High
Modelo Formation	High
Trancas Formation	High
Monterey Formation	High
Pico Formation	High
Plio-Pleistocene Marine Sediments	Moderate
Unconsolidated Quaternary Sediments	Low to High
Quaternary Landslide Deposits (Basal)	High
Colluvium (Hill Slope Deposits)	Low
Alluvial Fan Deposits	Low
Valley Fill Deposits	Moderate to High

* Excluding water-lain (aquagene) tuffs, which for this treatment are considered to be sedimentary rocks

environment. The low stream flows and the easterly littoral sand flows in the ocean close off the lagoon in the summer months. If there is any pollution of the lagoon water when it gets released, it could affect the health of swimmers and surfers.

The lagoon provides habitat to a number of migratory water birds, supports a dense riparian forest, supports habitat for the endangered tidewater goby and supports the southernmost reliable run of the remaining steelhead trout runs in the United

States. It also provides recreational access and educational opportunities for many school children.

Where Topanga Creek discharges into the Pacific Ocean, a berm has been built across the mouth of the creek by littoral drift and wave action, and a lagoon has formed due to the backwater effect of the berm. The main channel of Topanga Creek is 6.6 miles long with an average channel slope of approximately 70 feet per mile. Topanga Creek supports southern steelhead trout upstream of the lagoon. Topanga Creek is a tightly constrained creek due to steep canyon walls that broaden into an alluvial plain on leaving Topanga Canyon. Exotic flora as well as abandoned cars, houses, and shacks are found in the floodplain. Trancas Lagoon drains a watershed of 6,233 acres and is almost entirely within the SMMNRA. The lagoon is a nine-acre coastal lagoon at the mouth of Trancas Creek. Historically, Trancas Creek was an ephemeral creek fed by waters draining off the southern flanks of the Santa Monica Mountains and flowing through the 6-mile reach of Trancas Canyon. More recently, run-off from an upstream golf course has resulted in higher flows and the stream is now essentially perennial. Sandbars caused by wave action and littoral transport of sand close the mouth of the creek. Water ponds behind the berm and has to be breached mechanically. The creek has been impacted with concrete channelization and a concrete and boulder debris basin.

Zuma Creek drains a nine-square-mile (5760-acre) watershed. Lower Zuma Creek and lagoon are heavily impacted by a variety of alien plants, as well as heavy sediment loads. This perennial stream creates a 2.3-acre wetland at the mouth of Zuma Creek. An interagency project for the restoration of this area is currently being implemented.

Paleontological Resources

Paleontological resources, or fossils, are the remains of ancient plants and animals, as well as trace fossils such as burrows or tracks, that can provide scientifically significant information on the history of life on earth. Assessments of the scientific significance of these remains are based on whether they can provide data on the taxonomy and phylogeny of ancient organisms, the paleoecology and nature of paleo-environments in the geologic past, or the stratigraphy and age of geologic units. The potential educational value of paleontological resources is another criterion upon which significance assessments have been based. (Reynolds, 1995). Fossils that are out of stratigraphic context, that is, no longer occurring in their host rock unit, are normally considered to be of low scientific value because they can no longer be confidently related to a particular geological formation or time period. However, isolated fossil specimens may retain their educational value.

Fossils need not be mineralized to be of potential scientific value. Deposits resulting from geologically recent but rapid sedimentation, such as basal landslide deposits and marsh deposits, can yield the unaltered bones of extinct Pleistocene megafauna and paleobotanical (plant) remains. Similarly, fossils need not be older than 10,000 years (that is, of Pleistocene age or older) to be scientifically significant. Understanding the post-Pleistocene development of California's ecosystems relies on such younger fossils, and remains an important goal of scientific research (e.g. Adam, 1985).

Paleontological resources in the Santa Monica Mountains include isolated fossil specimens, fossil sites, and fossil bearing rock units. The paleontologic sensitivity of the SMMNRA varies across the landscape





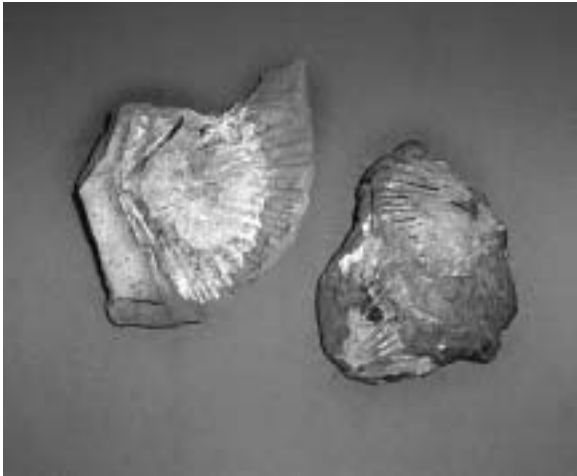
CHUMASH AND GABRIELINO/
TONGVA NATIVE AMERICAN INDIAN HERITAGE

CHUMASH PEOPLE have inhabited the Santa Monica Mountains for nearly 8,000 years. The Gabrielino/Tongva people moved into the eastern Santa Monica Mountains about 2,000 years ago, bringing a different language, religion, and social structure to the region. The interface zone between these two sophisticated and developing cultures may have represented one political alliance of Chumash and Tongva in the Santa Monica Mountain region. It is important to preserve their heritage.

Most park actions have the potential to affect the integrity of scientifically important archeological and/or cultural sites and values. Visitor use, park design and development, maintenance, cultural and natural resource preservation – as well as visitor education – are all of concern to contemporary Native American Indians. Law, policy, and the park mission requires effective consultation with these groups to ensure that their traditional values are represented with sensitivity in all park planning and implementation.

To meet the challenges to preserve diverse cultural values, ongoing relationships would be continued on a government-to-government basis with the Santa Ynez Chumash and the many diverse groups of non-reservation Chumash and Gabrielino/Tongva. All park planning efforts would involve opportunities for Native American Indian participation. Any proposed development would meet the rigorous historic and archeological compliance procedures of the National Park Service. In addition, Native American Indians would be encouraged to monitor the preservation of any artifact collections discovered or created by park activities.

Continued funding to preserve the cultural contributions to the Santa Monica region would allow a more complete representation of traditional values from the diverse heritage groups. It would further enable appropriate park planning, maintenance, resource management, collections, and interpretation that preserves cultural objects and landscapes, understands traditional values, and would sensitively interpret and present Native American Indian cultures to visitors.



Fossils found near Circle X Ranch (NPS photo by Phil Bedel).

depending on local geology as well as geomorphic factors. The geology and depositional history of different rock units, in turn, largely determines the potential for yielding scientifically or educationally significant fossil remains. The following is a summary of the paleontologic sensitivity of various rock formations in the SMMNRA.

The oldest paleontologic resources of the SMMNRA come from the Late Cretaceous Chatsworth formation. Ammonites, extinct mollusks related to the chambered nautilus, have been collected from this formation, as well as marine foraminifera, clams, snails, bryozoans, and shark teeth. A substantial portion of the Cenozoic period (the last 65,000,000 years), the Santa Monica Mountains area has been the site of marine deposition. There are a number of tertiary rock units in the mountains known to yield scientifically significant paleontologic resources (e.g., the Modelo, Pico, and Topanga formations). The sediments of the Modelo formation contain microfossils, clams, bony fish, whales, and algae. Bryozoans, gastropods, sharks, and cetaceans have been recovered from fossil sites in the Pico Formation. The Topanga formation, a shallow-water, marine

sandstone unit, has yielded bony fish, bivalves, and gastropods.

In opposition to marine sediments, terrestrial sediments often do not contain fossils. This is because they are normally deposited under subaerial conditions, an environment of deposition not conducive to fossil preservation. Extensive deposits of colluvium mantling the hills of the SMMNRA fall into this low-sensitivity category, as well as the alluvium of the outwash fans issuing from the canyons. In contrast, fine-grained (clay to fine sand) valley fill deposits have yielded the remains of a diversity of extinct Pleistocene land mammals. Landslide deposits have not traditionally been associated with high paleontologic sensitivity. However, recent discoveries in southern California of quaternary-age fossil plants entombed at the base of landslides have provided important new information on the ecological history of the region (e.g. Axelrod, 1988), and have been used to determine that this important phenomenon is distinctly episodic (Reneau et al. 1986).

Impact Topics - Cultural Resources

Brief Historical Overview of the Santa Monica Mountains Region

For thousands of years the Santa Monica Mountains have been at the center of complex human interactions that shaped the environment and affected cultural processes in wider contexts. The richness and diversity of the region's cultural resources reflect the density and diversity of human population in the mountains over time.

THE CHUMASH AND GABRIELINO/TONGVA

Native Californians were unknown to Europeans until the coastal expeditions of the Spanish during the 16th century. Two of the



most populous and sophisticated cultures the Spaniards encountered were the Chumash and Gabrielino/Tongva. The Chumash and Gabrielino/Tongva had been loosely organized into several major linguistic and geographic entities centered around the Santa Monica Mountains and nearby Pacific Ocean.

Chumash and Gabrielino/Tongva encampments, referred to by the Spanish as *rancherias*, were the centers of daily life. Large, permanent settlements were often comprised of as many as hundreds of people. A few encampments were located in the lowlands along inland rivers and streams and in sheltered areas along the coast. Smaller, outlying communities were connected to the larger settlements through social, kinship, economic, and religious ties. Seasonal villages, established primarily for harvesting of various fruits and seeds, also dotted the interior valleys. Over time, the Chumash and Gabrielino/Tongva developed monetary systems and exchange networks, acquired extensive astronomical knowledge, and produced exquisite basketry, bowls of steatite, stone, shell, and numerous pictographs. The Chumash and Gabrielino/Tongva had traded extensively among their own villages, as well as with neighbor groups.

The Chumash and Gabrielino/Tongva cultures thrived until the latter decades of the 18th century, when Spanish missions, which were sustained by Native American Indian labor, increasingly encroached upon their lands and lifeways. Divided and absorbed into the Spanish mission and ranch system, the Chumash and Gabrielino/Tongva lost control of their destiny. Mexican independence from Spain in 1821 also caused displacement and disruption through the mission system. In the aftermath of the Mexican-American War (1846–1848) and the annexation of California by the United States, a steady stream of American homesteaders and miners to the fertile and gold-laden lands

of California completed the displacement of the Chumash and Gabrielino/Tongva from their ancestral lands.

THE SPANISH AND MEXICAN ERAS

Spain and later Mexico claimed portions of what was to become the American West for more than three centuries (ca. 1540–1848). During the latter decades of the 18th century, Spain began establishing a chain of Franciscan missions in California (Los Angeles Pueblo established 1781, and the mission of Santa Barbara, the first permanent Euro-American settlement in the vicinity of the Santa Monica Mountains, was established in 1782). Because Spain possessed neither the manpower nor the resources to engage in the widespread colonization of California, the Franciscans at each mission utilized a largely Native American Indian workforce. Many Native American Indians left their villages voluntarily, induced by food, shelter, clothing, complex social and religious influences, and, in some cases, because of the need to individually heal from newly introduced diseases. Spanish soldiers conscripted others. The Native American Indians were fed, sheltered, clothed and provided a rudimentary education, but they were also compelled to forsake their centuries-old indigenous ways. To survive, many had to surrender their personal freedoms, and were frequently subjected to the lash, stocks, or irons. Others were subjected to European diseases that proved fatal to many mission Indians.

During the late 18th century, the Spanish began providing large tracts of land, known as *ranchos*, to veterans of the Spanish army and their families. Over 30 *rancho* concessions, often comprising tens of thousands of acres, were granted by the early 1800s. Seventeen *ranchos* were established in the Santa Monica Mountains, and the mountains were a valued source of water and grazing land for cattle. A largely Native American Indian workforce,



again either coaxed or conscripted, were among the earliest of the American West's cowpunchers. Long before ranching came into American life with the annexation of Texas in 1845, these vaqueros, or cowboys, rode horses outfitted with bit, bridle, and saddle, and used the lariat to rope and herd steers, and in the 1850s drove cattle north to the goldfields. The Spanish period rancho lifestyle left not only a strong equestrian tradition to southern California but a rich agricultural base of fruit orchards and vineyards grown for the missions.

When Mexico, whose territory included the American West, won its independence from Spain in 1821, Mexican officials and land speculators pressed for the distribution of mission property. During the 1820s and 1830s, the Mexican government passed legislation to both diminish the influence of the Franciscans and distribute mission lands to settlers, and by 1834 all of the mission lands were secularized and opened to occupation. In addition, the Mexican

government continued the Spanish practice, begun decades earlier, of granting private individuals large tracts of land.

Like Spain, however, Mexico could not sustain its hold upon the vast American West, surrendering the territory piece by piece to American settlers and soldiers over the course of the 19th century. By 1845 forces of the United States and Mexico were skirmishing over Texas and a year later war broke out. In 1848 the United States and Mexico signed the Treaty of Guadalupe Hidalgo, and Mexico surrendered more than 500,000 square miles of territory to the United States, bypassing the Chumash and other Native American Indian tribes.

CALIFORNIA STATEHOOD TO THE PRESENT

News of gold discovered in California swept across the nation in 1848, and Americans rushed west to find it. In 1850 California was admitted to the Union and San Francisco, Sacramento, Stockton, Los Angeles, and San Diego began to take form as cities. American



Albertson Ranch – Westlake, 1962 (photo by Ed Lawrence).



emigrants to California also discovered vast tracts of land either occupied by Native American Indians or held by *rancheros*, and the uncertainties and confusion over the ownership and boundaries of the land required years to sort out.

Native American Indians had no legal rights in early California. Even though they were bound to the land by millennia of occupation, they were simply ousted from favorable lands, and in some instances interned in reservations, modeled after the missions. Sometimes California Native American Indians were simply massacred in their villages. More troublesome for the new Californians were the legacy of the Hispanic land claims associated with *rancho* concessions, 17 of which had been granted in the Santa Monica Mountains.

In 1851 Congress passed the California Land Act, establishing a three-person Land Claims Commission and a complex legal mechanism to determine the legitimacy of Hispanic land claims. The indefinite boundaries of the unsurveyed landholdings, the lack of documentation in the possession of the claimants, and both the expenses of the legal fees and the time necessary to establish title in the courts, however, often delayed confirmation of landholdings, sometimes for decades. In addition, title to the former *rancho* concessions was often clouded by the host of American newcomers who, taking advantage of a process burdened with confusion and delay, simply settled on the land and were later looked upon favorably by the non-Hispanic courts.

By the 1870s, the insatiable demand for land in California prompted the subdivision of many of the larger landholdings. Since the latter decades of the 19th century, the rapid subdivision and re-subdivision of land, often punctuated by claims and counter claims, has been an enduring characteristic of much of the California landscape, including pockets

of the Santa Monica Mountains.

During the 20th century, a favorable climate, water supplied from Owens Valley and other sources, agriculture, oil, the movie industry and the burgeoning automobile industry facilitated the transformation of the Los Angeles basin into a megalopolis. Today, the greater Los Angeles metropolitan area is one of most racially and culturally diverse areas of the world and the Santa Monica Mountains are an island of open space amidst a sea of urbanization.

Archeological Resources

An estimated 30 percent of the land throughout the Santa Monica Mountains has been surveyed for archeological sites, and about 90 percent of National Park Service lands in the Santa Monica Mountains National Recreation Area have been surveyed for archeological sites. There are more than 1,500 known archeological sites in the Santa Monica Mountains, one of the highest densities of any mountain range in the world. Approximately 1,000 of the sites are within the recreation area boundaries, but only about 188 of the sites are on National Park Service lands. Many of the known sites show some appreciable disturbance due to the erosion that results from fire, flood, earthquakes, the effects of human land use practices, and vandalism.

NATIVE ARCHEOLOGICAL RESOURCES

Due to their dwindling numbers and the rapidly disappearing manifestations of their cultures during the 19th century, knowledge of the Chumash and the Gabrielino/Tongva is incomplete. Much of what is known of the Chumash and Gabrielino/Tongva is the result of early accounts, which primarily flowed from the quills of Spanish explorers and missionaries, and the material remains of their culture. The notes of Smithsonian ethnographer, John Peabody Harrington,

recently released, have led to a renaissance of Chumash studies.

Known native archeological resources in the Santa Monica Mountains range from pictographs, village sites and special-use sites such as ovens and other lithic accumulations. The native archeological sites collectively represent approximately 9,000 years of human use. The sites variously exhibit evidence of flaked and stone-ground tools and cultural features such as projectile points, knives, scrapers, milling slabs, and hand stones. Chert and obsidian flakes, the refuse of stone tool making, have been found along with fire-cracked rocks, rock art, middens stained by ashes from campfires, and organic remains. Such sites document the gradual adaptation of the Chumash and Gabrielino/Tongva to the region's resources over thousands of years. The Santa Monica Mountains represent an interface between these two complex cultures and are of scientific significance because of the opportunities to test hypothesis about cultural development, integration and change.

One of the major archeological sites in southern California, Humaliwo (CA-LAN-264), is located in the Santa Monica Mountains National Recreation Area. The site, which is listed in the National Register of Historic Places, represents over 3,000 years of use, through the Spanish mission period of the early 19th century. Chumash habitants of the site were recorded in the archives of the San Buenaventura mission. The site also contains a prehistoric cemetery dating back more than 1,000 years, as well as a historic cemetery dating from 1775–1825. The Tank Site (CA-Lan-1), located within Topanga State Park, is noteworthy for its rich yield of artifacts and cultural features. This site is used by archeologists as the defining location for early archaic cultures in southern California. The Little Sycamore Shellmound (Ca-Ven-1), located within Leo Carrillo State

Park on an ocean bluff is important as a defining site for early archaic cultures. Many other archeological sites in the Santa Monica Mountains, such as Talepop and Castle Peak, are potentially eligible for the national register.

There are 26 known Chumash pictograph sites in the Santa Monica Mountains, on both public and private lands, some of which have unfortunately been vandalized. One of the region's most noteworthy pictographs is within the recreation area boundaries near Zuma Canyon. The pictograph, which shows four figures mounted on horseback apparently depicting a historic event, was deemed eligible to be a national historic landmark. A second pictograph, in the upper Las Virgenes watershed outside of the recreation area's boundaries, has a documented solstice alignment, and is listed in the National Register of Historic Places.

ARCHEOLOGICAL RESOURCES

There were nearly 1,300 homestead claims in the Santa Monica Mountains, though not all of the claims were improved and patented. As more archeological surveys are undertaken, more information regarding historic archeological sites would become available, providing important interpretive links to the settlement and development of the mountains during the 19th and 20th centuries. One of the more notable sites is Talepop, (CA-Lan-229) a Chumash rancheria occupied into the early 1800s near the intersection of Mulholland Drive and Las Virgenes Road in Malibu Creek State Park. Reportedly, Chumash people made tiles for the Spanish in the latter period of Native American Indian occupation at Talepop.

Historic Structures

There are hundreds of structures in the Santa Monica Mountains and adjacent foothills that are considered to be of at least



local historical significance. Some structures are significant because of the events that occurred there. Rancho Sierra Vista, for example, is important for its contribution to the development of agriculture in Ventura County, particularly cattle and horse raising and the introduction of citrus and avocado orchards. Other structures are significant because of their occupant, such as the Will Rogers House or the Adamson House. Still others are significant for their architectural style, representing the diverse artistry of such architects as Wright, Neutra, and Schindler.

None of the missions established by the Spanish were within the boundaries of the SMMNRA. A few rancho era structures are within the boundaries, such as the Selpulveda adobe, as well as many structures built during the American homesteading and ranching era, such as the Chesebro Road (ca. 1880s).

Three structures within the SMMNRA's boundaries, but which are not on National Park Service lands, are listed in the National Register of Historic Places:

- **Adamson House and Grounds** – Erected in 1929, the Adamson House, located within Malibu Lagoon State Beach, is notable for its blend of Moorish and Spanish-Mediterranean architecture and the use of lavish tile art on floors and walls. In addition, the site's designed landscape reflects the long interaction between the house's inhabitants and the land. The house is significant for its association with a family who originally migrated to America in 1638 and whose descendants moved westward to California.
- **Looff's Hippodrome, Santa Monica Pier** – Looff's Hippodrome is a rare example of an early shelter built to house a carousel in an amusement park, and is one of only two such structures that remain on the west coast. The carousel in the Hippodrome is not the Looff carousel originally installed

in 1916, when the Hippodrome opened. The present carousel is a Philadelphia Toboggan Company carousel built in 1922 and installed in the Hippodrome in 1947.

- **Will Rogers House** – Located in Will Rogers State Historic Park, this house was the home of noted American humorist, writer, and motion picture actor – Will Rogers. Many trophies, collections, and personal effects of Will Rogers are exhibited in the house. The house, which was built ca. 1926, and adjacent land was presented to the State of California in 1944, for use as a state park.



Will Rogers House and Polo Grounds.

In addition, there are about 27 structures on National Park Service lands – at the Paramount, Rancho Sierra Vista and Peter Strauss Ranches – that are currently recorded in the recreation area's List of Classified Structures (see list of Classified Structures, Appendix - Table 6). Determinations of eligibility for listing in the national register have not been completed for the structures, but the structures at each ranch are considered to be potentially eligible for listing as historic structures or districts. An historic resource project study will begin in 2001 and be completed in 2003. One aspect of the study is to recommend structures, sites, districts and cultural landscapes on NPS land

that appear to be eligible to the National Register. Another aspect of the project is to prepare draft National Register nomination forms for those projects. Since an historic resource study has not been done, the full number of historic structures, sites, districts and cultural landscapes in the NPS portion of the SMMNRA is not known.

Cultural landscapes according to the National Park Service's *Cultural Resource Management Guideline* (DO-28, 1998), a cultural landscape is

...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions

Cultural landscapes are the result of the long interaction between man and the natural landscape. Shaped through time by historical land use and management practices, as well as natural disasters such as fires, floods, and earthquakes, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The evidence left behind of property ownership, technology, economic conditions and cultural values provides a good source of information about specific times and places. Long-term preservation of these landscapes is a challenge.

General threats to cultural landscapes include vandalism, neglect, structural deterioration, recreation area development and the impact of visitors. Failure to maintain the features that are subject to natural aging and decay in the area could result in structural deterioration. Wooden fences, for example, would deteriorate from long term exposure to

elements. Historic vegetation would eventually disappear as part of its natural life cycle. Historic and prehistoric artifacts such as antique nails and equipment parts, building debris and stone tools – all which help to define the context for a cultural landscape – might be picked up by visitors. Recreation area operations could negatively impact historic trails and roads as they are converted to other uses or obliterated for other purposes.

In 1998 a draft cultural landscape inventory (Level 0) was completed for SMMNRA that identified potential cultural landscapes. A cultural landscape inventory documents up to three scales of information: potential cultural landscapes, potential component landscapes, and contributing features. A cultural landscape encompasses the largest contiguous area that is potentially eligible for the National Register of Historic Places. Some areas within a landscape may be further documented in more detail as component landscapes, which are physical components of a landscape, are defined. Component landscapes either contribute to the overall landscape's significance or are significant in their own right.

A draft cultural landscape report was prepared for Paramount Ranch in 1997. The draft *Paramount Movie Ranch, Cultural Landscape Report* identified Paramount Ranch as eligible for listing in the National Register of Historic Places, for the property's longtime association with Paramount Pictures Corporation and the American motion picture industry (ca. 1923–1948). Today the National Park Service administers approximately 680 of the Paramount movie ranch's original 2,400 acres, much of which was undeveloped, mountainous land. The 680 acres, however, encompass the core of the former movie ranch – the headquarters area, the sites of nearly 70 percent of the motion picture sets, and a preponderance of the landscape and





Fields of grain – Hidden Valley (photo by Ed Lawrence).

vegetation character that provided the natural setting for more than 150 motion pictures. The internal road system built by Paramount is largely intact and eight of the original buildings and structures remain in the movie ranch's former headquarters area – a barn, an equipment storage shed, prop storage sheds, the mess hall/kitchen, the mill/carpentry shop, and the fire patrol station. These structures remain in various stages of alteration, recounting how Paramount developed the site to serve its needs.

The indigenous Chumash and Gabrielino/Tongva peoples have occupied land within the Santa Monica Mountains since prehistoric times. During the 19th century, farms and cattle ranches were established in the area. Throughout the 20th century, much of the land in the

Santa Monica Mountains was built up for recreational and commercial uses. Each cultural landscape contains component features that include barns, corrals, fences, farmhouses, archeological sites, roads and trails, water management structures, non-native vegetation and landscaping.

Ethnographic landscapes in the recreation area include natural features such as traditionally-used plants and sacred sites that were important in the lives of native inhabitants of the past, some of which are still used today. These landscape features provide tangible evidence of the activities and habits of people who occupied, developed, used and shaped the land to serve their needs.

Mulholland Drive is a historic linear landscape unto itself. Additional transportation routes of importance are

El Camino Real/Ventura Boulevard/Highway 101, PCH, and the Route 66 terminus at Santa Monica Pier.

According to the 1998 inventory, SMMNRA encompasses at least 12 cultural landscapes, in addition to Paramount Ranch, that are potentially eligible for listing in the national register. Component landscapes were also identified for three of the potential cultural landscapes (Table 16). For a complete listing of cultural landscapes please see Table 5 in the Appendix.

A Level 1 Cultural Landscape Inventory is scheduled for the SMMNRA in 2001 that would provide baseline information. The purpose of this inventory is to identify cultural landscapes, inventory them in a national database, record information about the resources relative to their location, description, characteristics, historical development and current management, and provide park staff with the information necessary to make informed decisions about their treatment.



FILM HISTORY AND PARAMOUNT RANCH

MANAGING AND PRESERVING a movie ranch as a living cultural landscape holds unique challenges. The infrastructure and buildings at Paramount Ranch are over 70 years old. The historic structures are in need of safety upgrades (wiring, water, etc.) and stabilization. A fire protection system needs to be added in all structures. The movie sets are decorative attachments, which need constant maintenance to keep them safe and usable. Although filming is a historic use at Paramount Ranch, movement of large vehicles and temporary placement of sets or set dressings may disrupt or damage the landscape. The continued traditional use must be balanced with NPS natural resource preservation goals to prevent cumulative damage to the landscape.

The primary goal of the park at the ranch is to preserve the elements of the cultural landscape and the uses associated with it. The continued use of the site by the film production community would be encouraged. Preservation would include stabilization of structures and upgrading the utilities to meet public safety standards. Secondary goals would include expansion of the interpretation of filming in the landscape through a variety of diverse programs both on- and off-site. A final goal for the site is to generate revenue to support operations, preservation, and interpretation of Paramount Ranch and filming history in the mountains. Most of the goals can be achieved through expansion and diversification of activities.





Paramount Ranch (NPS photo).

In addition, the National Park Service plans to conduct the following research at the recreation area:

- Historic resource study.
- Park administrative history.
- Archeological surveys and assessments, as necessary.
- Historic structure reports, as necessary.
- Cultural landscape inventories and/or reports for potentially significant landscapes.
- Ethnographic overview and assessment of park, and ethno-history study.

Ethnography

Ethnographic resources are defined by the National Park Service as any "...site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (*Cultural Resource Management Guidelines 1996*). The Santa Monica Mountains were and are the home of two of the largest groups of Native American Indians in California: the Chumash and the

Gabrielino/Tongva. Ethnographic sites of the contemporary Chumash and Gabrielino/Tongva preserve and reflect their traditional values.

Throughout the 20th century, the economic opportunities of southern California have attracted large numbers of Native American Indians to the greater Los Angeles metropolitan area. Today Los Angeles and Ventura Counties have the largest concentration of Native American Indians in the nation, representative of virtually every tribal group from across the United States, though few are descendants of the Chumash or Gabrielino/Tongva, whose ancestral lands became much of the Los Angeles megalopolis. Despite centuries of difficulties, the Native American Indian community of southern California has persisted and, in fact, exhibits great variety and vigor today. Traditional ways seem to be resurgent as Native American Indians seek to retain their heritage even as they succeed in the cities. Similarly, the region's Native American Indians are working together to achieve common goals without losing their tribal identities. The region's Native American Indian community has grown, changed, and adapted, just as the Euro-American community has.

The Santa Monica Mountains National Recreation Area has held regular consultations with the region's contemporary Native



Mulholland Highway (NPS photo).

Table 16

CULTURAL LANDSCAPES POTENTIALLY ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES	
Potential Cultural Landscapes – SMMNRA	Component Landscapes
Santa Monica Mountains Chumash-Gabrielino/Tongva Ethnographic District	Satwiwa/Boney Peak Saddlerock/Point Dume/Paradise Cove Saddle Peak Muwu/Calleguas Creek/Satwiwa Shrine Humaliwu/Talapop/Medea Creek Castle Peak/El Escorpion Burro Flats Seminole Hot Springs Upper Topanga Whales Eye
Simi Hills Historic Ranching District	Cheeseboro Canyon Morrison Ranch
Rancho Sierra Vista	Ranch Center and North Ranch Center
Reagan Ranch	Meadows and hills adjoining ranch buildings
Franklin Canyon	(none)
Peter Strauss Ranch	(none)
Solstice Canyon	(none)
Mason Homestead	(none)
Decker Homestead	(none)
De Anza Trail	(none)
Will Rogers Ranch	(none)
Stunt Ranch Homestead	(none)
Adamson Grounds	(none)
Topanga Canyon	(none)

American Indians since the recreation area's founding, and members of the region's Native American Indian community have shared their knowledge and skills with the SMMNRA. One result of the consultations is the identification of significant areas in the Santa Monica Mountains that require protection, such as the Boney Ridge, where Native American Indians have a long and deeply spiritual history of interaction. Many of these significant areas, however, either transcend the boundaries of the SMMNRA or are outside of the recreation area boundaries,

which requires the National Park Service to work cooperatively with other agencies and landowners to protect these ethnographic values and aspects of indigenous land management of the parklands.

The Santa Monica Mountains National Recreation Area also continues to encourage traditions of music, crafts, stories, language, and basketry while providing authentic interpretation to the public by contemporary Native American Indian groups such as the Friends of Satwiwa and California Native Basketry Association.



Other ethnographic groups have contributed greatly to the region. Since the founding of the Pueblo of Los Angeles in 1781 by a mixed group of African-Americans, Native American Indians, and Europeans, the region has been ethnically diverse, and today the greater Los Angeles metropolitan area is one of most racially and culturally diverse areas of the world. The following groups join the Chumash and Gabrielino/Tongva people by their historical links the land:

- Yokut, Mohave, Yuman
- Aleutian Islander
- Spanish (Basque)
- Mexicans
- Californios
- African-Americans
- Chinese
- Japanese
- Germans
- French
- Norwegians
- Homesteaders



Chumash Dancer (photo by Dennis Garcia).

The ability of the SMMNRA to foster cultural diversity may be one of its most important resources. Ethnographic contributions provide important cultural and historical elements to the recreation area. The SMMNRA mission to recognize and completely understand its ethnographic resources continues with consultation with Native American Indians. Further comprehensive ethnographic studies are needed to provide the appropriate context for the varied ethnographic resources associated with the recreation area.

COLLECTIONS

The SMMNRA has more than 46,000 museum objects, specimens and archives stored in the recreation area's Museum Collection Storage Facility at Rocky Oaks. The collections are organized into seven broad categories – archeology, ethnology, history, archives, biology, paleontology, and geology – and provide evidence of activities that brought them into being and information about associated people, organizations, events, and places. The collections serve as reference material for staff and students, and documented material for public exhibit and programs. The physical condition of the SMMNRA's collections is generally good to excellent.

In April 1995, the National Park Service, California State Parks, and Santa Monica Mountains Conservancy established a Memorandum of Understanding for the cooperative management of the Santa Monica Mountains National Recreation Area. The Memorandum of Understanding provides the basis for developing a joint approach to the management of collections. The California State Parks and Santa Monica Mountains Conservancy expressed interest in having the recreation area act as repository for various collections. These include archeological objects from state lands

surrounding the recreation area and archival material that documents the activities of the SMMC within the mandated recreation area boundary. In addition, the University of California at Los Angeles is interested in turning over archeological artifacts in their collections that came from sites within the recreation area's boundaries. The Southwest Museum, located in downtown Los Angeles, has sizable collections from sites within the SMMNRA. It features collections from the sites in Leo Carrillo State Park, Point Mugu State Park and others. The University of California at Berkeley has the collection from the Tank Site (CA-Lan-1).

Impact Topics - Visitor Experience

CARRYING CAPACITY

To make sure that visitation does not impair resources and compromise visitor experience, the NPS and CSP are required by law to determine a carrying capacity for its parks. Carrying capacity is a measure used to determine what types and levels of visitor use can be accommodated while maintaining resource and social conditions consistent with the purposes of the park and its management objectives. Establishing carrying capacity does not mean the National Park Service must immediately restrict the number of people allowed in the recreation area. The objective is to monitor the number of visitors to the recreation area to protect it from overuse.

While the general management plan and environmental impact statement recognizes the desirability of limiting the impacts of public use through a variety of management and design strategies, specific limits on the numbers of visitors seems neither feasible or desirable. The open nature of the recreation area would make

limits difficult to establish and enforce. The absence of clear evidence that resource damage is occurring because of too many visitors leaves the proposal without good justification. If, when, and where it became apparent that over-use was occurring to the detriment of the recreation area resources, steps would be taken to halt the damage by whatever means were necessary, up to and including placing specific limits on the number of visitors. Considering the extensive size and varied opportunities afforded by the national recreation area, it would seem likely that such limits, if used, would be very localized in their application.

Current carrying capacity of the SMMNRA, based on the experience of the recreation area management agencies and the current knowledge of resource conditions, is estimated to be somewhere in the excess of 33 million recreation visits annually.

Options for working with visitor use levels include:

- Encourage use of shuttles instead of private automobiles.
- Visit the recreation area during less busy times such as weekdays.
- Guide people to less sensitive areas.
- Limit encounters between visitors in more remote areas through dispersal or parking constraints.
- Control activity with improvements such as formal trails and boardwalks, carefully planned parking, ecologically sensitive visitor needs facilities, increased ranger/law enforcement presence, and interpretive programs or signs that inform people of elements of concern for resource managers.

The carrying capacity for all NPS-owned sites would be determined on a site-by-site basis using the philosophy that the desired conditions of resource protection and quality visitor experience is maintained.



PUBLIC ACCESS

► Vehicles

The existing traffic conditions on the major routes tend to degrade the visitor experience to the recreation area. The current traffic volumes on most major roads within the SMMNRA are near or exceeding their capacity during daily peak travel periods. Traffic projections indicate that volumes on these roads would continue to increase as a result of anticipated growth in the greater Los Angeles area. As a result, traffic conditions on the major roads within the recreation area are anticipated to continue to deteriorate. The large traffic volumes create congestion, wildlife mortality, poor air quality, traffic-related noise, and the need for larger transportation facilities.

The majority of visitors use their private vehicles to access the area. This private vehicle use is creating transportation problems that are impacting the overall visitor experience and management of the SMMNRA. Traffic congestion, large traffic volumes on the roads within the SMMNRA, and the conflict between visitors and recreation area commuters reduces the quality and appeal of the visitor experience.

There are currently few transportation alternatives available to visitors. There is also a lack of public information about these alternative transportation options. Even if other mass transit options were available, most of the existing visitor facilities within the recreation area are not equipped to accommodate large transit vehicles.

Additionally, the appearance of the roadside environment in many areas detracts from the scenic quality of the recreation area and the visitor experience. In particular, street lighting, intrusive development and overhead power lines are considered unsightly.

In summary, most of the major routes through and near the SMMNRA are currently operating at or near capacity. Highway 101

and the eastern portion of PCH are heavily congested during the commuter hours of the typical weekday. Pacific Coast Highway is also heavily loaded on most days during the summer and most weekend days during the rest of the year. The east-west corridors through the area carry relatively high speed, bumper-to-bumper traffic during the morning and evening peak periods. The combination of high speed and high vehicle density resulting from commuter traffic imposes driving pressures on recreational visitors to the recreation area. Most drivers consider driving under these conditions as stressful and undesirable.

► Pedestrians, Mountains Bikes, Equestrians

There are several formal trailheads or parking areas throughout the SMMNRA (see Figure 4, the existing conditions and recreation opportunities map) which become quite crowded on weekends and in the summer months. Beach parking is particularly difficult during these periods, with informal off-road parking evident along PCH. Pedestrian safety is an issue as there are very few crosswalks and traffic is moving at high speeds. There are several paths that are marked as public access to the beach but have no formalized parking and are marked as “No Parking” zones.

Pedestrian access to the mountain hiking and biking trails is not so treacherous. While informal off-road parking has developed near hiking trails, in most places traffic is not heavy. Many “social trails” have been created out of neighborhoods and back yards causing a confusing trail network throughout the mountains. This has created erosion and damage to vegetation.

EDUCATIONAL PROGRAMS

Interpretive tours and programs have increased in recent years through the combined efforts of the National Park Service, California State Parks, the Santa Monica Mountains Conservancy and

others. Educational and interpretive themes, programs and facilities are developed specific to the character and resources of the individual recreation area units. Many interpretive services are offered in conjunction with volunteer and docent programs, as well as staff. These services range from guided tours and special events, to campfire and trail programs, to services encouraging participation of teachers and school groups. Through CSP, active seasonal programs are available such as Junior Rangers and Junior Lifeguards. Many of the recreation area units offer interpretive facilities, exhibits, films, and publications to enhance the visitor's experience, appreciation and understanding of the resources.

► National Park Service

SMMNRA has a five-part education program designed to reach a multitude of students and cover a range of recreation area themes. Comprehensive presentations deliver information in a variety of ways and the programs complement the management objectives of the recreation area. The overall approach is balanced to offer both on-site and off-site opportunities to schools that may or may not have transportation available. Programs have been designed for the diverse population of students in the Los Angeles and Ventura County school districts. The goals of the NPS education programs are

- to introduce and motivate students to learn about the major themes of the SMMNRA
- to introduce students to the NPS mission of preservation and protection of natural and cultural resources
- to meet the needs of students and educators in the Los Angeles and Ventura counties school system
- to develop public support for the management of the NPS and the SMMNRA



Ranger-guided tour at Rancho Sierra Vista/Satwiwa (NPS photo).

The five NPS programs include:

- **Parks as Laboratories (PAL) Studies of Land, Water and Air** – Students selected to participate in this program are from a primarily urban audience who have had little contact with the natural world or national parks. This program provides a direct link between their world and the natural world. The air, water and land exercises give students a hands-on experimental connection to the recreation area.
- **National Parks Labs-Studies of Wild Land Fire Ecology** – This three-year developmental program is funded by the National Parks Foundation. It focuses on fire ecology, integrated science and resource management. The program integrates scientific concepts across many disciplines in an outdoor lab setting.
- **Biological Diversity Program: The Chumash, A Changing People, A Changing Land** – This program, conducted on-site, is designed to teach third and fourth grade students the concept of biodiversity. By learning about the Chumash people, students also consider their own role in a biologically diverse land.





EDUCATION PROGRAMS AND REGIONAL DIVERSITY

SANTA MONICA MOUNTAINS National Recreation Area represents one of the greatest opportunities for the National Park Service to meet the challenge of the “New America.” Located in Los Angeles and Ventura Counties, the park is in the backyard of one of the most ethnically diverse areas of the country.

The park already boasts a strong interpretive and educational program, uses partnership opportunities, and features facilities that can serve as settings for day use, overnight, and nature study outings. In 1998 over 900 programs were offered to more than 40,000 children. However, the effort would be barely adequate for the population today or in the future.

To meet the education challenge of the present as well as that of the future, Santa Monica Mountains National Recreation Area has developed an education strategy for the 21st century. Its purpose is to define and lay out the role of educational activities within the overall park program to ensure that education fulfills the purpose of the park, the goals of the agency, and the needs of the community. Program goals are to inspire all greater Los Angeles residents to claim inheritance of and stewardship for all national parks, to deliver an outdoor experience to every child in Los Angeles, and to build a National Park Service constituency for the 21st century.

- **Cultural Heritage Program: One Land, Many People, Many Ways** – Children are introduced to the Native American Indian and Spanish heritage of the area by learning how all cultures contribute to history. They gain an appreciation for ethnic, racial and cultural diversity that is a large component of southern California today.
- **Geography and History Education Outreach Program: National Park Legacy** – Children are offered a chance to explore the national park system from their

classrooms using recycled park brochures from different national parks. Students work independently and in groups to answer questions on unique geographic, historic and cultural features in parks.

► **California State Parks**

In a cooperative effort with the State Parks Foundation, *Coming Home to California* is a statewide educational program designed to connect children and teachers to the historical and environmental treasures of their state. Teacher guides give information on the

natural and cultural history of the region while noting features and programs of individual state park units. The intent of the program is to inspire optimism, concern, and a sense of responsibility for California's future. The following educational themes identify the program's focus:

- Incorporate California's natural and cultural heritages into the students' lives by introducing the resources into their sense of self and place.
- Encourage teachers and students to get out into the SMMNRA.
- Focus on the larger social and cultural patterns on the land in California so that a foundation is built to understand landownership, public trusts, public lands and governmental stewardship.
- Stress the issue of biodiversity throughout the state.
- Touch on current issues of habitat restoration, ecosystems, and archeological site management.

► **Santa Monica Mountains Conservancy**

Education programs include:

- **The Recreational Transit Program (RTP)** – provides low-cost bus transportation for people who otherwise would not have access to a mountain park or beach. Target populations often do not have a reliable transportation source, and public transportation routes bypass most of these natural areas. The RTP provides the critical link for tens of thousands of city dwellers to attend programs offered by NPS, California State Parks, the Santa Monica Mountains Conservancy, the Sierra Club, and over a dozen non-profit program providers and docent groups throughout the SMMNRA. In 1998–99 more than 27,000 people visited the mountains on RTP buses.



Educational program at Rancho Sierra Vista/Satwiwa (NPS photo).

This program is funded by a grant from the city and county of Los Angeles transportation funds.

- **The Temescal Canyon Field Science Program** – is a three-day/two-night environmental education program funded by the Los Angeles Systemic Initiative through Los Angeles Unified School District. It has been in operation more than four years, and over 5,500 students have taken part in the program. The curriculum is designed to immerse students in the natural world through a combination of hands-on, experiential science activities and sensory experiences, and meets California Science Framework standards. This program is located in Temescal Gateway Park.
- **Our Junior Ranger Program** – provides a series of eight sessions teaching participants about the natural and cultural resources a park has been set aside to preserve. Youth have an opportunity to work closely with our ranger staff who serve as mentors and educators, passing on to the Junior Rangers the skills, knowledge, and motivation to become stewards of



the parks once they have completed their training.

- **The Earth Adventure Program** – offers three options to groups and individuals:
- **Overnight Earth Adventure Camp** – provides young people the ability to participate in the time-honored tradition of camp, with an emphasis on exploring the natural world of our local mountains. The curriculum is specifically designed for at-risk children with little or no experience with the natural world, and offers a unique combination of environmental science, experiential learning and leadership activities. This program is located in Temescal Gateway Park and is available for three-days/two-nights, five-days/four-nights, or weekend sessions.
 - ✓ Earth Adventure Day Camp – provides an environmental science-based program for parents looking for a meaningful alternative to childcare during winter and summer breaks.
 - ✓ Earth Adventure Field Trips – offers groups a three-hour interpretive program in the Santa Monica Mountains focusing on the natural and cultural resources in the various recreation areas.
 - ✓ The William O. Douglas Outdoor Classroom (WODOC) – offers school programs on weekdays and public programs on the weekends. All programs are free of charge and are staffed by WODOC's volunteer docents. WODOC programs operate under the management of the SMMC and the Mountains Recreation and Conservation Authority and are funded through a line item expenditure from the National Park Service.
- **The Ramirez Canyon Park Outreach Program** – targets seniors and the disabled from disadvantaged areas of the region. Within the unique setting

of Ramirez Canyon Park, which includes Americans with Disabilities Act (ADA) accessible garden paths, a public access trail, a native plant demonstration garden, picnic areas and a proposed creekside overlook, participants are provided docent-led interpretive programs discussing historical, ecological and architectural information on the SMMNRA. The outreach program is supported by funding generated by the Streisand Center Garden Tour Program, which continues to draw an audience that normally would not venture into a typical “mountain” park, to learn about the canyon and its broader relationship to the SMMNRA.

Impact Topics - Land Use and Socioeconomic Environment

Land Use

This section presents information regarding current and designated land uses for the SMMNRA and the surrounding jurisdictional areas.

EXISTING AND DESIGNATED LAND USES

The SMMNRA is located within both Los Angeles and Ventura Counties. The boundary of the SMMNRA also lies within or adjacent to the cities of Agoura Hills, Calabasas, Los Angeles, Beverly Hills, Malibu, Thousand Oaks, and Westlake Village. Figure 13 illustrates the SMMNRA boundary relative to these cities. The SMMNRA encompasses a total of approximately 130,000 acres of land. Rural and urban residential development are, along with committed public and private open space, the dominant land uses within the area. A significant portion of the area has been preserved for the purpose of environmental protection, recreation, and

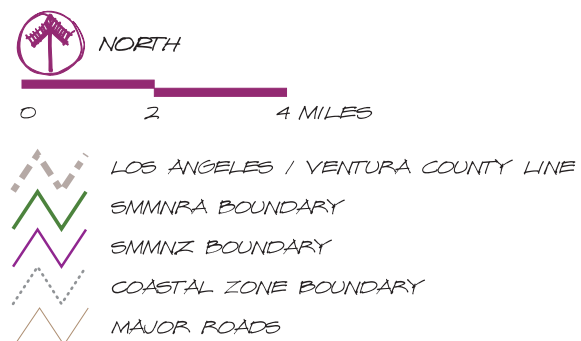
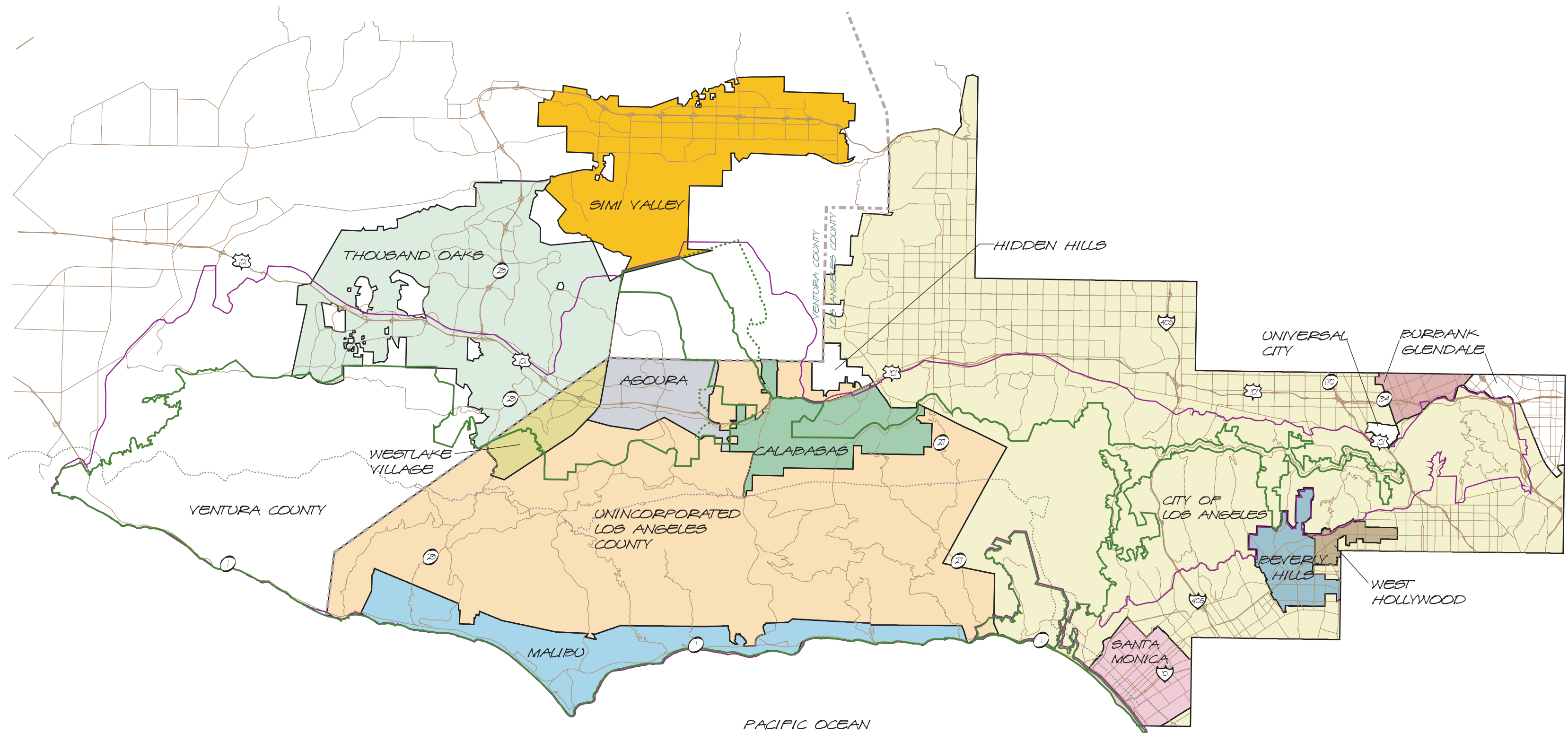


FIGURE 13:
CITY & COUNTY
JURISDICTIONAL
BOUNDARIES

SANTA MONICA MOUNTAINS
NATIONAL RECREATION AREA
CALIFORNIA

INCLUDES UNITS OF NPS, CALIFORNIA STATE PARKS,
 AND THE SANTA MONICA MOUNTAINS CONSERVANCY
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public safety. Commercial and industrial uses comprise a relatively small percentage of the area's existing land use.

COASTAL ZONE MANAGEMENT

A significant amount of the SMMNRA occurs within the coastal zone. The SMMNRA includes approximately 40 miles of shoreline, stretching from Point Mugu to the city of Santa Monica. Numerous broad sandy beaches are the destination of millions of national recreation area visitors annually.

In 1976, the California State legislature enacted the Coastal Act to protect public accessibility to the coast, natural and agricultural resources, and the coastal landscape's scenic beauty. In the Santa Monica Mountains the coastal zone protected under the Coastal Act extends five miles inland, to include approximately 93,500 acres of interior watershed. The coastal zone forms an important major wildlife network that sustains many scenic and natural resource values of the region. Coastal Act policies promote environmentally sustainable development in the mountains, and development proposals are analyzed for compliance with these policies. The Coastal Act has been a vital policy tool that helps park agencies protect natural resources in the face of considerable pressure from private landowners seeking to develop their properties. The Coastal Act intended development-permitting authority to eventually be transferred to local governments upon completion of their Local Coastal Plans (LCP). Ventura County completed the LCP for their portion of the Santa Monica Mountains, and has received coastal zone permitting authority. In unincorporated Los Angeles County, authority for coastal development permits would be transferred from the California Coastal Commission to Los Angeles County upon completion of the county's Santa

Monica Mountains LCP within the next two to three years. An LCP for the incorporated City of Malibu is being prepared by the California Coastal Commission. The Malibu LCP should be certified by the Coastal Commission within the next year.

LAND USE PLANS

Each of the counties, cities, and communities within and surrounding the SMMNRA has established land use plans to guide future development within their jurisdictions. These land use designations vary by jurisdiction, but all distinguish between areas of future development and open space. The relevant plans and policies regulating land use designations were reviewed for the SMMNRA and the surrounding area. These include *Los Angeles County's Malibu/Santa Monica Mountains Interim Area Plan*, *Santa Monica Mountains North Area Plan*, and *Malibu Local Coastal Plan*, as well as Ventura County's *South Coast Coastal Plan*, *Oak Park Plan*, and *Lake Sherwood-Hidden Valley Area Plan*. In addition, general plans for the cities of Agoura Hills, Calabasas, Beverly Hills, Malibu, Thousand Oaks, and Westlake Village, as well as relevant community plans from the city of Los Angeles, were evaluated. A general description of the existing and designated land uses within and surrounding the SMMNRA are provided below. Expected future development trends within the region are also discussed. Generalized designated land uses identified in the various general plans are illustrated in Figure 14.

► Los Angeles County Land Use Plans

EXISTING LAND USE

Land use adjacent to and within the unincorporated portions of the SMMNRA study area is primarily open space and residential in nature and rural in character. In the northern portion of unincorporated Los Angeles County, rural communities,



scattered rural residences, and suburban residential tracts dominate the area. Commercial and industrial development within these unincorporated northern portions of the SMMNRA is clustered in the area along the north side of Highway 101 and east of Parkway Calabasas, between the cities of Hidden Hills and Calabasas. Land use patterns within the southern coastal and mountainous portions of the county vary from commercial and high-density residential development along the Pacific Coast Highway to parcels of 40 acres or more located throughout the remainder of the area.

LAND USE PLANNING

Planned land use within the incorporated county of Los Angeles is guided through the implementation of individual community and city general plans. The first land use planning guidance document within the remaining unincorporated area was the *Malibu/Santa Monica Mountains Interim Area Plan* (Interim Plan), which was first adopted in 1981. The recently released *Santa Monica Mountains North Area Plan*, which supercedes the *Interim Plan* in the northern portion of the study area, was approved by The Los Angeles County Board of Commissioners in October 2000. Therefore, both the *Interim Plan* and the *North Area Plan* are included in the analysis to provide adequate assessment of both existing land use policies. The Malibu/Santa Monica Mountains Land Use Plan (LUP) (adopted in 1987) has development authority over unincorporated areas of Los Angeles County that lie within the coastal zone. Efforts are underway to update and certify a complete Local Coastal Plan for the unincorporated Los Angeles County portion of the Santa Monica Mountains to provide a more comprehensive planning approach for the region as a whole (County of Los Angeles 2000).

Malibu/Santa Monica Mountains Interim Area

Plan – The *Interim Plan* is incorporated as a component of the *Los Angeles County General Plan*, and was last reprinted with amendments in November of 1998.

The *Interim Plan* study area represents the central portion of a 60-mile-long coastal mountain range from Ventura County to the metropolitan center of Los Angeles, an area that is expected to ultimately almost double in population size, from 65,000 to approximately 100,000 individuals (County of Los Angeles 1987). The *Interim Plan* identifies 10 goals to serve as principles to which the details of the plan must conform. These goals generally encourage the organized development of the region in a way that would minimize encroachment into existing natural open space areas and would provide a cohesive pattern of development. The *Interim Plan* emphasizes that a primary function of local government would be to provide for the regulation and location of private recreational development that is supportive of public recreation. The *Interim Plan* sets local policy on the location and intensity of public recreational facilities and environmental values that the county would encourage state and federal park programs to consider. In addition, the *Interim Plan* distinguishes between areas suitable for urban development and those to be maintained in rural conditions. The development policy of the *Interim Plan* limits urban development to locations that are adjacent to other urban uses, with available essential services and few natural constraints. In addition, the *Interim Plan* emphasizes that areas classified as rural are not to be encroached upon by urban development.

Santa Monica Mountains North Area Plan –

The *Santa Monica Mountains North Area Plan* guides development within the unincorporated portions of Los Angeles County located north of the Coastal Zone.



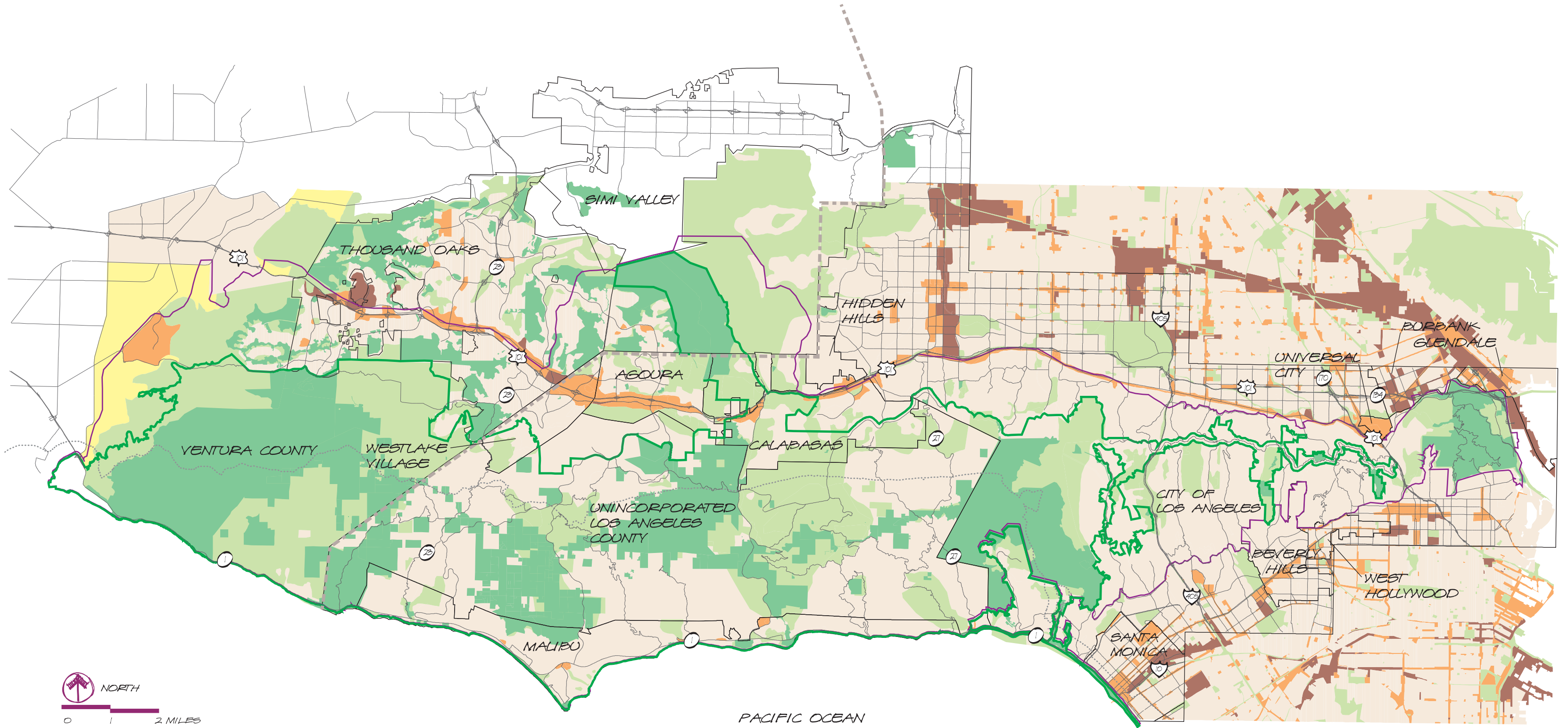


FIGURE 14:
**PROPOSED
 LAND USE**
BASED ON LOCAL PLANS
SANTA MONICA MOUNTAINS
NATIONAL RECREATION AREA
CALIFORNIA

INCLUDES UNITS OF NPS, CALIFORNIA STATE PARKS,
 AND THE SANTA MONICA MOUNTAINS CONSERVANCY
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The North Area Plan replaced the *Malibu/Santa Monica Mountains Interim Area Plan* that has been in effect since 1981. The *North Area Plan* encompasses the 32.2 square miles (20,608 acres) of unincorporated Los Angeles County land west of the city of Los Angeles and north of the Coastal Zone.

The *North Area Plan's* conservation and open space element emphasizes that "resource protection has priority over development" and includes provisions to locate new development so that it conforms to constraints of the natural environment and contributes to the open space character of the area. Nearly 5,000 acres have been preserved within the planning area of the *North Area Plan*, including lands under the management of the NPS, California State Parks, and Santa Monica Mountains Conservancy. Although large additional blocks of open space currently exist within the region, these are not dedicated and remain available for various types and intensities of development. The *North Area Plan* draws a distinction, however, between areas that are suitable for urban/suburban development or expansion and those that are to be maintained as rural. In particular, the plan seeks to limit suburban development to those areas that are already developed, are adjacent to existing cities, have access to existing essential services, and have few natural constraints (i.e., steep hillsides). Areas classified in the *North Area Plan* as "rural" are not to be developed using suburban patterns. However, these areas, as well as areas classified as "mountain lands," are available for low-density single-family residential development, in addition to various other low-density uses. The majority of county lands within and adjacent to the SMMNRA boundary are designated as "open space" (approximately 5,200 acres) and "mountain land" (approximately 13,500 acres) uses. Development within the area is expected to continue and the population is

projected to ultimately increase to 9,000 individuals housed in 3,700 dwelling units at buildout.

Malibu/Santa Monica Mountains Land Use Plan

– The Malibu/Santa Monica Mountains LUP was adopted in 1986 as a component of the *Los Angeles County General Plan Coastal Element*. It currently applies only to that area of Los Angeles County that remains unincorporated (the city of Malibu was incorporated in 1991 and is therefore no longer affected by the existing Malibu/Santa Monica Mountains LUP). The area under the LUP encompasses 27 miles of the Pacific coast, from the Ventura County line to the Los Angeles city limits on the east, and extends from the Pacific Ocean to the slopes of the Santa Monica Mountains five miles inland. The LUP emphasizes that future development should be limited to areas within or adjacent to existing development, although it does not preclude development of low-density residential and institutional uses within the remainder of the area. Future development is therefore expected to primarily occur in the Coastal Terrace, which is the current focus of development in the region. Development of the Coastal Terrace, which only encompasses eight percent of the LUP area, would include infilling existing developed areas and some intensification of the major uses. Lower-density development within the mountain areas of the LUP region could accommodate an additional 2,050 new units.

Santa Monica Mountains Comprehensive Plan –

Modeled after the coastal plans of the Santa Monica Mountains, this plan was initiated to protect vital natural resources. The state of California formed the Santa Monica Mountains Comprehensive Planning Commission and gave that body the power to plan for the future of the mountains, but not the regulatory authority to ensure that its plans would be implemented. The Santa



Monica Mountains Comprehensive Planning Act and subsequent adoption of a comprehensive plan established a direction for maintenance and acquisition of lands in the study area to be held in public trust. A substantial portion of the study area is currently in public ownership, largely due to the sizeable parklands/open space owned and operated by various public agencies. Examples include, but are not limited to, Charmlee Natural Area, Deer Creek Canyon, Leo Carrillo State Park, Malibu Lagoon State Park, Malibu Springs, Malibu Creek State Park, Point Dume State Reserve, Point Mugu State Park, Solstice Canyon, Topanga State Park, and Zuma/Trancas Canyons. Landownership within the SMMNRA boundary is generally split between private land, which occupies 54 percent of the region, and public lands, of which parklands account for approximately 42 percent of the total area.

► Ventura County Land Use Plans

EXISTING LAND USE

A portion of Ventura County within the SMMNRA boundaries is mostly undeveloped open space. A relatively small percentage of the area, primarily south of Thousand Oaks and west of Westlake Village, is developed with rural residential uses or used for agricultural purposes. New residential development is being constructed west of Westlake Village, adjacent to Los Angeles County. Numerous single-family residences have been built along Yerba Buena Road, Yellow Hill, Hasler Road, Cotharin Road, Mipolomol Road, Deer Creek Road, and Pacific View Road. Existing small pockets of rural and low-density residential uses and vineyards are scattered throughout the hilly central and southern sections of the county.

LAND USE PLANNING

Ventura County General Plan / Area Plan for the Coastal Zone – The study area is partially

located within the south coast jurisdiction of the *Ventura County Coastal Area Plan*. The plan encompasses approximately 18,600 acres along 13.1 miles of the Pacific coast in Ventura County. Approximately 90 percent of the coastal subarea is designated “open space” by the county, with minimum 10-acre lot sizes. The area includes most of the federally owned land in the county’s coastal zone, including the U.S. Navy Pacific Missile Test Center at Point Mugu. In addition, the area encompasses Mugu Lagoon, the last coastal estuary system in Southern California that still exists in its approximate natural site. Most of the area, which extends up to five miles inland, is undeveloped, with only segments along Deal’s Flat and the existing Solromar community developed. Point Mugu State Park is the area’s major recreational facility, encompassing 7,400 acres, and is part of the SMMNRA. Land between the park and Leo Carrillo State Park has been identified for priority acquisition to the SMMNRA, as well as a number of other south coast properties. The area includes two youth camps which occupy approximately 1,788 acres near Yerba Buena Road and Little Sycamore Canyon. The camps are designated for rural land uses. All of the coastal area, except the Point Mugu Missile Test Center and the existing Solromar community, is designated as a special “Santa Monica Mountains” overlay zone that requires development to be assessed on a case-by-case basis to protect the Santa Monica Mountains as a coastal resource of statewide and regional significance.

The plan identifies policies regarding the SMMNRA (Policies 10-13). The policies indicate a dedication to increasing community access to existing and new parks, as well as a long-range planning perspective to increase park facilities. The plan also supports the maintenance of open space designations (minimum 10 acre lot size) within the Santa Monica Mountains, and

encourages a possible redesignation of some areas to minimum lot sizes of 40 to 100 acres depending on slope, water availability, access, and geologic and fire hazards.

Ventura County General Plan South Half –

The *Ventura County General Plan South Half* guides development in the portion of the study area located north of the coastal plan and west of the city of Thousand Oaks. Dedicated open space lands account for a very small percentage of the county's total area and include local parklands and lands owned by the Santa Monica Mountains Conservancy. While these dedicated lands cannot be developed in the future, other portions of the county that are currently vacant, but designated for other uses, may be developed with various types and intensities of use. The county's land use plan identifies the majority of county lands within and adjacent to the SMMNRA as open space. Allowable uses under this classification include rural residential (with 10-acre parcels), open space-recreation, and open space-resource protection. The majority of the open space area, an estimated 10,000 acres, is currently privately held within the county portion of the SMMNRA. Ventura County is one of the principal agricultural counties in the state. However, with the exception of some small horticulture and ranch-like uses, agricultural uses are not a prominent land use within the SMMNRA boundary.

Lake Sherwood/Hidden Valley Area Plan –

The Lake Sherwood/Hidden Valley area encompasses approximately 8,252 acres within Ventura County, adjacent to the Los Angeles County boundary and just west of Westlake Village. More than 85 percent of the area has designated open space lot sizes of more than 40 acres. The *Area Plan* projects an ultimate population of just over 4,000 individuals, primarily concentrated in the 950 acres that are designated as rural and urban residential areas. The majority of the remaining population is expected to remain

on extremely low-density open space lots located throughout the rest of the area and ranging in size between 20 and 80 acres.

Oak Park Area Plan – The Oak Park area is comprised of 12,263 acres, with 11,096 acres planned for open space. Approximately 921 acres would be for residential development, 15.2 acres reserved for commercial uses, and 187.7 acres for community facilities. The plan identifies areas to be acquired and included in the open space system, including land between Cheeseboro Canyon and the Oak Park community. Acquired open space areas, as well as currently designated open space areas, would include deed restrictions to ensure their maintenance as open space into the future. The plan also includes a policy to ensure that all development and subdivisions of land shall be consistent with the *Santa Monica Mountains Comprehensive Plan* (Policy 3.7.2) in order to achieve the goal of maintaining consistency with the plans of the NPS, the Santa Monica Mountains Conservancy, and the city of Thousand Oaks.

City of Agoura Hills

EXISTING LAND USE

The city of Agoura Hills is currently located outside the northern SMMNRA boundary. Residential land uses represent approximately 31 percent of the city's land area, the majority of which are located north of Highway 101. Low-density residential land uses and single-family subdivisions are found primarily in the eastern portion to the city. With a few exceptions, all of the city's commercial uses are generally located along Highway 101 and Kanan Road north and south of Thousand Oaks Boulevard. Industrial development within Agoura Hills is located exclusively along Highway 101.

Agoura Hills is only partially urbanized, and contains many large areas of open space and undeveloped land. Open space and vacant parcels comprise about 44 percent of the city's area. Large tracts of hillside open



space form Agoura Hills' northern and southern boundaries.

LAND USE PLANNING

Ladyface Mountain, located on the south side of the freeway, consists of approximately 747 acres of land, with 225 acres suitable for development. The remaining acreage is hillside property with a topographic slope exceeding 30 percent. The hillside would be maintained as open space. Overall, 36 percent of the city's area is committed to long-term open space, while residential development (in addition to Ladyface Mountain development) is expected to increase to occupy 1,724 acres, or almost 35 percent of the total city area. Commercial and business park uses are designated for only one percent of the city area.

City of Calabasas

EXISTING LAND USE

Numerous residential communities dominate the landscape west of Old Topanga Canyon Road. These land uses also occur on sites scattered throughout the hilly southeastern sections of the city of Calabasas. Older single-family tract housing occurs at the eastern and western portions of the city. Higher density residential uses are concentrated along Las Virgenes Road and at the extreme eastern corner of the city. Retail, office, and light industrial land uses also occupy a small portion of Calabasas. The current resident population of 27,000 individuals is located within the 13-square-mile (8320-acre) city, although the city has the potential of augmenting its jurisdiction to include an additional 12,186 acres of county unincorporated lands to the north and south.

LAND USE PLANNING

The city's *General Plan* establishes the necessary land use, development philosophy and direction to maintain the environmental, social, physical, and economic health and

vitality of the city. The plan identifies suitable locations for growth for the city of Calabasas. The land use plan includes the 12,186 acres of land adjacent to the municipal boundary that could potentially be incorporated into the city, a part of which is located within the SMMNRA. The portion located in the SMMNRA is designated "non-urban," which allows uses such as open space and rural residential. The city anticipates future development within infill parcels, at approved but not-yet-built project sites, and on the fringes of the existing urban areas where rural residential development currently exists. Its open space policy targets 3,000 acres of land to be reserved for purposes of resource conservation, recreation, and protection of public safety. In addition, approximately 81 acres of land are designated either commercial or commercial planned development. However, most of these uses are adjacent to or north of Highway 101, and not adjacent to the SMMNRA.

Dedicated open space lands account for 25 percent of the city's area and cannot be developed in the future. They include local parklands and lands owned by the Santa Monica Mountains Conservancy.

► City of Los Angeles Communities

The following communities are located within the city of Los Angeles. These communities use separate land use guidance plans, which set forth goals, objectives, policies and programs that pertain to the respective communities. The following discussion describes the existing and designated land uses within the affected communities.

Bel Air – Beverly Crest Land Use Plans

EXISTING LAND USE

The Bel Air – Beverly Crest community is located south of Mulholland Drive, west of Laurel Canyon Boulevard and the city of

Beverly Hills, north of Sunset Boulevard, and east of the San Diego Freeway. The Bel-Air Beverly Crest community is approximately 9,900 acres in size, and includes 541 acres owned by the Santa Monica Mountains Conservancy, as well as Los Angeles County land located in Franklin Canyon, which is part of the SMMNRA.

The community is characterized by a number of distinct residential neighborhoods associated with canyon and hillside locations. The areas that are in proximity to the SMMNRA include Laurel Canyon, Laurel Hills, Coldwater Canyon, Franklin Canyon, Benedict Canyon, and Beverly Glen.

LAND USE PLANNING

Bel Air-Beverly Crest Community Plan –

The Bel Air-Beverly Crest Community Plan identifies the historic single-family residential character of much of the community as a valuable asset to protect and maintain. The plan encourages the development of more intensive multi-family housing and commercial uses outside of established single-family residential areas. Nineteen hundred acres of open space and 3600 acres of desirable open space are identified on the plan map. The currently designated open space, including the 541 acres owned by the Santa Monica Mountains Conservancy, would remain undeveloped and additional parcels of desirable open space would be purchased when feasible and appropriate. The plan states that designated open space is not intended for residential development or other urban uses. Instead, the space is to be used for recreation, wildlife refuge, and preservation areas.

Mulholland Scenic Parkway Specific Plan –

Mulholland Drive stretches along the northern boundary of the Bel Air-Beverly Crest community area. A separate *Mulholland Scenic Parkway Specific Plan* guides development along the roadway, and is

incorporated into affected local community plans to ensure the maintenance of Mulholland Drive as a scenic parkway in the Santa Monica Mountains. *The Specific Plan* contains provisions to minimize the impacts of new development along the roadway, and to preserve open space and recreational uses in the area. In addition, the plan encourages the preservation of existing native vegetation and the natural environment surrounding it.

Brentwood – Pacific Palisades

EXISTING LAND USE

The Brentwood-Pacific Palisades community contains approximately 24,000 acres. The community is bordered on the southwest by the Pacific Ocean, on the south by the city of Santa Monica and Wilshire Boulevard, on the east by the San Diego Freeway, and on the north by Mulholland Drive. The western border is adjacent to the unincorporated portion of Los Angeles County, which abuts the city of Malibu. A large portion of the acreage contained within the community is mountainous, with public open space accounting for approximately 55 percent of the land area. In the Brentwood-Pacific Palisades community, an abundance of open space areas exist; separate from land under the control of the city. The federal, state, county and city properties in the community comprise approximately 13,157 acres of existing open space land, including Topanga and Will Rogers State Parks. Commercial uses are located along specific streets, totaling approximately 130 acres. No industrial uses exist in the community.

LAND USE PLANNING

The Brentwood-Pacific Palisades Community Plan identifies the desire to maintain existing single-family home portions of the community, as well as established multi-family areas of development. In addition, the Plan encourages the development of



mixed-use areas near or within existing commercial zones to provide housing in proximity to jobs. No industrial uses are designated within the community. Overall, residential land uses account for 41.4 percent of the total area, while open space accounts for 55.8 percent of the community area. Commercial uses only account for 0.7 percent of the community area. The Open Space element of the Plan emphasizes that natural resources within the plan area should be conserved and that priority of development in natural and scenic resource areas should be given to those uses which complement the resource.

***Canoga Park – Winnetka –
Woodland Hills – West Hills***

EXISTING LAND USE

The Canoga Park-Winnetka-Woodland Hills-West Hills community is located within the northeastern portion of the SMMNRA. The portion of the community located within the SMMNRA boundary is generally bound on the east by Topanga Canyon Boulevard and on the west and north by Mulholland Drive. Land use south of Ventura Boulevard and adjacent to the study area is generally limited to rural residential and open space uses. Much of the community is on hillside and mountainous terrain.

LAND USE PLANNING

Canoga Park – Winnetka – Woodland Hills –

West Hills Community Plan – The *Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan* encompasses a total of 17,887 acres, much of which is located north of Ventura Boulevard. Land uses north of Ventura Boulevard are higher-density than those adjacent to the SMMNRA, which is characterized by low-density hillside residential development and open space. Overall, the community population is expected to be primarily low density residential development, with lower

concentrations of medium and very low density residential development. As much of the remaining undeveloped lands as feasible would be preserved for open space and recreational sites. The community plan also provides direction for future land uses and development through the *Mulholland Scenic Parkway Specific Plan*, as discussed above.

Ventura – Cahuenga Boulevard Corridor

Specific Plan – An additional specific plan addresses commercial development along the Ventura-Cahuenga Boulevard Corridor and has been adopted to guide development along the roadways. The plan establishes standards for building setbacks, signage, and other visual characteristics to enhance the community aesthetics and to make the commercial center more pedestrian-oriented and reduce traffic congestion.

Encino-Tarzana

EXISTING LAND USE

The Encino-Tarzana community is located adjacent to a portion of the northern boundary of the SMMNRA boundary. Existing land uses in proximity to the SMMNRA are generally limited to single-family estate homes located along the hillside of the planning area. In recent years, there has been increasing pressure for development in the hillside areas close to the SMMNRA boundary. The Santa Monica Mountains Conservancy has acquired vast sections of the mountain/hillside areas in the plan area. These open space recreation area lands are considered highly valuable and serve to fulfill the recreational needs of the community since topographical constraints do not allow for the development of community park sites (Howell, 1999). Land use within the community is currently divided between a number of uses, including 64 percent residential, 33 percent open space, and

2.9 and 0.4 percent commercial and industrial, respectively.

LAND USE PLANNING

The current focus of commercial and industrial land uses within the Encino business district along Ventura Boulevard and within the Tarzana business district near both Reseda and Ventura Boulevards is proposed to remain the community's primary regionally significant commercial areas. The two commercial areas provide concentrations of medium residential apartment development as well as serving as the focal points for shopping, civic, and social activities for Tarzana and office uses for Encino. The plan projects a maximum development capacity of 33,630 dwelling units. The distribution of dwelling units would be split between medium density (25 percent), low density (28 percent), and very low density (39 percent) housing. Open space and local park acquisitions and development are also identified as a priority for the community, although no specific provisions are made to either protect existing space or acquire additional space. Both the *Mulholland Scenic Parkway Specific Plan* and *Ventura/Cahuenga Boulevard Corridor Specific Plan* apply to this community as well.

Hollywood

EXISTING LAND USE

The SMMNRA is located within a very limited portion of the Hollywood community area. The Mulholland Drive scenic corridor, which traverses through the northwestern portion of the area, and Runyon Park are two specific recreation area features within the community plan area. Hollywood Freeway (Highway 101) on the east and Laurel Canyon Boulevard on the west generally bound Mulholland Drive scenic corridor segment. Existing land uses within the community of Hollywood as a whole

include 38 percent open space, which is concentrated in the northwest portion of the community, outside the SMMNRA project area. Residential uses constitute 52 percent, with high-density development centered along Sunset Boulevard and low-density development primarily located in the hills to the north, much of which is within the SMMNRA boundary.

LAND USE PLANNING

The community plan has designated the portion of Mulholland Drive within the plan area as part of the *Mulholland Scenic Parkway Specific Plan*. While the community plan designates areas on each side of the roadway for low density residential uses, the specific plan has also assigned buffer zones on each side of the roadway to limit future development adjacent to the roadway. One buffer zone is 500-feet-wide and the other is a half-mile wide. Other than the provision identified in the *Mulholland Scenic Parkway Specific Plan*, as discussed above, the community plan makes no other recommendation relative to the SMMNRA.

Sherman Oaks – Studio City – Toluca Lake – Cahuenga Pass

EXISTING LAND USE

The Sherman Oaks-Studio City-Toluca Lake-Cahuenga Pass community is located adjacent to the northeast boundary of the SMMNRA. The community plan is bound by the communities of North Hollywood, Van Nuys-North Sherman Oaks on the north, Hollywood, Universal City and a portion of the city of Burbank on the east, Encino-Tarzana on the west and Beverly Crest-Bel Air to the south. Land use within the SMMNRA and areas adjacent to the boundary is limited to low-density residential and open space. Currently, Coldwater Canyon Park and Wilacre Park, both part of the SMMNRA, provide recreational and open space resources to



the community. Mulholland Drive traverses the planning area along its entire length.

LAND USE PLANNING

The *Sherman Oaks-Studio City-Toluca Lake-Cahuenga Pass Community Plan* provides local guidance for future development within the area. The Community Plan identifies future development sites, and emphasizes the need to keep industrial uses north of Ventura Boulevard, near other higher-intensity uses, such as medium-density residential and commercial uses. The plan projects most of the population would be housed in either low- or low-medium density residential development. The plan also emphasizes the desire to maintain the historic single-family residential character of much of the area, which comprises at least 68 percent of the community. Seven percent of the community is designated open space, which primarily occurs as local parks scattered north of Ventura Boulevard due to constraints on park development in the southern hillside portion of the community. Both the *Mulholland Scenic Parkway Specific Plan* and the *Ventura/Cahuenga Boulevard Corridor Specific Plan* apply to this community.

City of Beverly Hills

EXISTING LAND USE

The city of Beverly Hills is an affluent urban environment within the greater Los Angeles area. There is very little open space or undeveloped land. Parks make up less than three percent of the city's land and vacant land occupies less than two percent. The city's land uses feature approximately 70 percent residential and 10 percent commercial development.

Santa Monica Boulevard, a major transportation route, subdivides the city. Single-family residences are the predominant land use north of Santa Monica Boulevard, whereas the land south of Santa Monica

Boulevard is used for mostly commercial or multi-family residential development and other uses.

LAND USE PLANNING

Providing long-term stability and maintaining the quality of life are the priorities of the city of Beverly Hills. The city proposes to accomplish these objectives by recognizing and responding to issues, such as the deterioration of older housing, the loss of the competitive ability of commercial areas, and the increased problems with parking and accessibility. Substantially greater residential development is proposed in the city's *General Plan*. The plan also proposes potential limits on strip commercial land uses. The plan proposes that the city evaluate whether commercial development is appropriate in specific locations, whether it should be encouraged and concentrated in certain parts of a commercial area, and whether it should be discouraged in others. The city also recommends that industrial areas should be planned for their eventual phase-out, to later be redeveloped for residential uses – with the exception of the area generally bounded by Santa Monica Boulevard, Beverly Boulevard, Foothill Road, Alden Drive and Maple Drive.

City of Malibu

EXISTING LAND USE

The city of Malibu extends along the coastline, forming the southernmost boundary of the recreation area. Malibu is the only city located entirely within the national recreation area. City growth over the past 70 years has resulted in a combination of parks and open space, rural residential development, commercial uses, and visitor-serving facilities, located primarily along the Pacific Coast Highway.

Approximately 22 percent of the city area is occupied by residential development that currently includes 5,623 units on 2,707 acres. Dedicated open space accounts for 1,870

acres, while vacant land comprises the majority of land in the city of 7,578 acres. Existing land use types within the SMMNRA and adjacent to federal parklands consist mostly of low-density residential uses and vacant and open space uses.

LAND USE PLANNING

Federal, state, city and other public agencies and private entities comprise the landownership groups in the city of Malibu. The city lies fully within the California Coastal Zone. The California Commission is currently preparing the Malibu Local Coastal Plan (LCP). The Malibu LCP should be certified by the Coastal Commission within the next year, thereafter delegating the coastal development permitting process to the city. Due to its unique environmental value, history of park development and the creation of the SMMNRA, a significant portion of the city is in public ownership. About 60 percent of the land from shoreline to coastal hills is privately owned. Vacant land and open space within Malibu occupy 89 percent of the city area and consist of undeveloped land, parks, public and privately owned beaches, environmental hazard areas (i.e., floodplain and earthquake prone areas), steep slopes, and existing natural conservation areas. Several goals, objectives, and implementation measures in the city's general plan emphasize the need to protect and enhance the natural and environmental resources of the city. Public open space, including regional and local parks, beach parks, and public open space used for recreation, total 1,870 acres. Of this total, 744 acres are developed regional and local parks. Agricultural practices also occur on a very small fraction of the land within the city. Horticulture and horse ranches are more common, and occur most frequently in conjunction with residential development or as a transitional use of the land. Horticultural uses, including retail and wholesale commercial

operations, occupy about 25 acres citywide, while horse ranches occupy approximately 40 acres of land in the city.

City of Thousand Oaks

EXISTING LAND USE

As shown in Figure 13, the SMMNRA generally abuts the southern boundary of the city, with some overlap. Land use between the east-west circulation routes of Highway 101 and Potrero Road consists of residential, nonresidential and open space. Prominent knolls and hills are present throughout the city.

Approximately 50 percent of the city is developed. Nonresidential uses such as commercial, commercial-industrial, industrial and institutional generally occur along major roadways in proximity to Highway 101 and locations that serve residential communities throughout the city. The open space system consists of existing and planned parks, recreation areas, golf courses and lands not developable due to natural physical features. The city has also established two agricultural preserves (on 298 acres) and associated Land Conservation Act contracts with the property owners, although the plan notes the unsuitability of the soil and other conditions that make large-scale agricultural operations impractical.

LAND USE PLANNING

The city of Thousand Oaks plan area encompasses 60 square miles (38,400 acres). Eighty percent of residential areas within the city are planned for single-family residential development, while the remaining 20 percent is planned for multi-family housing. Numerous policies within the city's general plan identify the need to cluster development and limit road access and development to preserve large, contiguous open space areas. Much of the plan area is reserved for open space.



Ownership patterns within the city consist of multiple public and private entities. Due to its open space system and associated land management policy, public entities own and manage 12,894 acres of open space lands. The city planning area extends beyond the city boundary.

City of Westlake Village

EXISTING LAND USE

The city of Westlake Village encompasses 5.62 square miles (3597 acres) and is located approximately 40 miles northwest of Los Angeles. The city is bound by the city of Thousand Oaks in the northwest at the Los Angeles-Ventura County line, the city of Agoura Hills on the east and southeast, and the county of Los Angeles to the south and west (refer to Figure 13). A relatively large portion of the SMMNRA is located within the city's corporate boundaries. Land use within the city of Westlake Village is divided between 1,333 acres of open space, which accounts for 37 percent of the entire city area, 757 acres of residential land uses, and 833 acres of vacant land, as well as minimal areas of rights-of-way, industrial, commercial, and public lands. A majority of the residential land uses within the city are located south of Highway 101 in the central portion of the city. Commercial uses are limited to areas close to Highway 101. A majority of the industrial and business park uses are centered north and south of the Highway 101/Lindero Canyon Road interchange.

LAND USE PLANNING

The *City of Westlake Village General Plan* indicates that much of the area's current open space may potentially be developed in the future, including the large expanses of hillside area along the eastern city boundary. One of the major privately owned parcels that remains open space includes an approximate 342-acre parcel owned by the

Las Virgenes Municipal Water District. No public open space lands are located within the SMMNRA boundaries. While 62 percent of the current undeveloped acreage would continue to be preserved as open space, the remainder is available for development. These potential developments are primarily low-density residential in nature, and the ultimate developed densities remain uncertain due to the occurrence of steep slopes and rock outcrops in some of the areas. At buildout, the *General Plan* estimates that a maximum of 990 additional residential units could be developed. According to the city's implementation programs, the city would continue to work with groups in the acquisition and maintenance of open space lands, including the SMMNRA.

Population, Housing, and Employment

POPULATION CONDITIONS

Los Angeles County is the most populous county in the state while Ventura County maintains a population that is ranked 14th in the state overall. According to recent census information, the population of Los Angeles County grew approximately 18 percent between 1980 and 1990. During the same period the population of Ventura County rose approximately 28 percent (higher than the state average of 26 percent) or approximately 10,000 – 15,000 per year.

Although Los Angeles County experienced the slowest growth in the nine-county southern California area in recent years, overall county population is expected to increase approximately 10 to 15 percent by the year 2000. Ventura County is expected to increase approximately 14 to 16 percent in population by the year 2000. Refer to Table 17 for the Southern California Association of Governments (SCAG) population growth forecast in the project affected areas.

Table 17

POPULATION FORECASTS				
Geographic Area*	1990	2000	2010	2015
City of Los Angeles	3,618,000	4,118,000	4,766,000	5,079,000
VCOG: Ventura County	669,000	774,000	872,000	930,000
VCOG: L.A. County Cities	138,000	183,000	225,000	250,000
Westside Cities	221,000	240,000	261,000	271,000
Subtotal	4,646,000	5,315,000	6,124,000	6,530,000
Affected Counties	1990	2000	2010	2015
County of Los Angeles	8,860,000	9,950,000	11,286,000	11,943,000
County of Ventura	669,000	774,000	872,000	930,000
Subtotal Counties	9,529,000	10,724,000	12,158,000	12,873,000
Total SCAG Region	14,637,000	17,515,000	20,516,000	22,000,000

*The boundaries of the geographic areas are coterminous with the subregions utilized by the Southern California Association of Governments (SCAG), including the city of Los Angeles, two segments of the Ventura Council of Governments (VCOG), and the Westside Cities.

Source: SCAG Regional Comprehensive Plan (1996).

HOUSING CONDITIONS

Population in the recreation area-affected counties has continued to increase faster than the supply of new housing units. In much of the two affected counties, this has resulted in increased household size and lower vacancy rates. Housing patterns in the two affected counties have tended toward multi-family dwellings and away from single-family units. The total housing stock in Los Angeles County in 1990 was approximately 3.2 million units. This represented a 10 percent increase in the total number of housing units from 1980 counts, as compared to a corresponding 12 percent increase in population between 1980 and 1990 estimates. Housing forecasts for Los Angeles County are expected to grow approximately 10 to 12 percent by the year 2000. In 1980, Ventura County had an estimated 179,500 housing units and grew to approximately 228,000, an increase of approximately 27 percent. This unusually

high increase in housing units could be attributed to the county experiencing one of the highest growth rates in the southern California region during the 1980s and early 1990s and also to available, affordable open space relative to Los Angeles County that could be developed. Housing forecasts for Ventura County is expected to grow approximately 20 percent by the year 2000. Refer to Table 18 for housing growth forecast in the project affected areas.

EMPLOYMENT CONDITIONS

According to data provided by the Los Angeles and Ventura Counties, the services sector is currently the major employment sector in the study area. Wholesale and retail trade account for approximately 20-25 percent of workers in the study area, while manufacturing accounts for approximately 15 percent of the employment.

According to socioeconomic projections shown in Table 19, the rate of employment



Table 18

HOUSING FORECASTS				
Geographic Area*	1990	2000	2010	2015
City of Los Angeles	1,345,000	1,484,000	1,676,000	1,783,000
VCOG: Ventura County	228,000	272,000	314,000	337,000
VCOG: L.A. County Cities	52,000	66,000	80,000	89,000
Westside Cities	117,000	124,000	131,000	136,000
Subtotal	1,742,000	1,946,000	2,201,000	2,345,000
Affected Counties	1990	2000	2010	2015
County of Los Angeles	3,161,000	3,472,000	3,872,000	4,098,000
County of Ventura	228,000	272,000	314,000	337,000
Subtotal Counties	3,389,000	3,744,000	4,186,000	4,435,000
Total SCAG Region	5,328,000	6,189,000	7,249,000	7,820,000

*The boundaries of the geographic areas are coterminous with the subregions utilized by the Southern California Association of Governments (SCAG), including the city of Los Angeles, two segments of the Ventura Council of Governments (VCOG), and the Westside Cities.

Source: SCAG Regional Comprehensive Plan (1996).

grew in the study area by approximately 8 to 10 percent between the years 1990 and 2000. As shown in the employment forecasts listed in Table 19, employment would increase at similar rates between the 2000 and 2010. According to the socioeconomic data and discussions with planners from project-affected cities and counties, the area surrounding the SMMNRA is considered to be a “jobs rich” area.

Transportation

REGIONAL AND LOCAL HIGHWAY NETWORK

The existing transportation setting and conditions in the vicinity of the Santa Monica National Recreation Area are described below and illustrated in Figure 15. Information for the description was obtained from field observations and traffic volume count data obtained from the Southern California Association of Governments.

The Santa Monica Mountains National Recreation Area (SMMNRA) is generally located west of Los Angeles between the Pacific Ocean and the San Fernando Valley. Within the boundaries of the SMMNRA are several state parks and numerous private home sites. Pacific Coast Highway, which is State Route 1, and Highway 101 (also known as Ventura or Hollywood Freeway) are the major east-west arterials through the area near the SMMNRA. Both of these highways serve as major commuter corridors connecting Los Angeles with the residential areas in the surrounding counties. Mulholland Highway, which runs along the mountain crests, is the only scenic corridor within the SMMNRA that has a general east-west alignment.

Several roads traverse the SMMNRA in a general north-south alignment. These roads include Interstate 405 (San Diego Freeway), Topanga Canyon Boulevard (State Route 27),

Table 19

EMPLOYMENT FORECASTS				
Geographic Area*	1990	2000	2010	2015
City of Los Angeles	1,965,000	2,072,000	2,213,000	2,276,000
VCOG: Ventura County	275,000	337,000	410,000	444,000
VCOG: L.A. County Cities	68,000	82,000	93,000	98,000
Westside Cities	231,000	247,000	261,000	268,000
Subtotal	2,539,000	2,738,000	2,977,000	3,086,000
Affected Counties	1990	2000	2010	2015
County of Los Angeles	4,610,000	5,084,000	5,670,000	5,912,000
County of Ventura	275,000	337,000	410,000	444,000
Subtotal Counties	4,885,000	5,421,000	6,080,000	6,356,000
Total SCAG Region	7,076,000	8,205,000	9,691,000	10,257,000

*The boundaries of the geographic areas are coterminous with the subregions utilized by the Southern California Association of Governments (SCAG), including the city of Los Angeles, two segments of the Ventura Council of Governments (VCOG), and the Westside Cities.

Source: SCAG Regional Comprehensive Plan (1996).

Malibu Canyon Road/Las Virgenes Road, Kanan Dume Road, and Decker Road/Westlake Boulevard (State Route 23). Of these, I-405, Malibu Canyon Road and Kanan Dume Road are most heavily used by commuter traffic. These north-south connectors link PCH with the communities located along Highway 101: Woodland Hills, Calabasas, Agoura Hills, Westlake Village, and Thousand Oaks. The major east-west arterials and the north-south connector routes make up the arterial network in and around the SMMNRA.

The arterial routes mentioned on the previous page provide for the movement of the vast majority of the traffic that passes near or through the SMMNRA. There are numerous smaller roads that branch off the arterial network, and provide direct access to the residences and visitor use areas located within the SMMNRA.

Average Daily Traffic (ADT) volumes that use the roads best define the current

traffic conditions on the roads in the vicinity of the SMMNRA. The California Department of Transportation and the Southern California Association of Governments (SCAG) maintain a database that contains traffic volume data for many of the roads within the study area. This database of information was used to identify the existing traffic volumes. This information, which represents 1998 volume data, is presented in Figure 15.

A Level of Service (LOS) analysis was performed on various roads in the vicinity of the SMMNRA. LOS represents the range of operating conditions for different types of facilities. The value is based on the ability of a road or intersection to accommodate varying amounts of traffic. These levels are given letter designations from A to F, whereby LOS A represents the best operating conditions and LOS F the worst or saturated flow conditions. This analysis is intended to determine how well roads are currently



Table 20

LEVEL OF SERVICE SUMMARY				
Route	From	To	1998 ADT	1998 LOS*
U.S. Hwy 101	Las Virgenes Rd.	Kanan Rd.	183,200	E
Mulholland Hwy.	Topanga Canyon	Old Topanga Canyon	7,400	D
Mulholland Hwy.	Topanga Canyon Blvd.	Malibu Canyon Rd.	2,800	B
Mulholland Hwy.	Kanan Dume	SR 23	150	
PCH	I-10	Sunset Blvd.	68,700	E
PCH	Malibu Canyon Rd.	Kanan Dume	26,000	B
PCH	SR 23	Point Mugu	10,800	A/D**
Topanga Cyn.	PCH	Mulholland	14,200	E
Malibu Cyn. Rd.	PCH	Mulholland	22,800	F
Kanan Dume Rd.	PCH	Mulholland	10,700	E
SR 23	PCH	Mulholland	1,000	A

* LOS represents PM peak hour conditions.

** LOS A/D represents LOS A where there are two travel lanes in the direction of travel and LOS D where there is only one travel lane.

functioning, with respect to variables such as traffic flow and other prevailing conditions. The LOS evaluation was conducted according to the procedures outlined in the Transportation Research Board's *Highway Capacity Manual* (HCM) - *Special Report 209* and the *Highway Capacity Software* (HCS) for roadway sections. Field data collected in April of 1999 was used in the analysis, along with SCAG traffic volume data. A summary of the LOS analysis for the major routes in and near the SMMNRA is presented in Table 20.

Based on the LOS analysis it appears that three of the four north-south route connections across the SMMNRA are currently operating at or near capacity during the PM peak hour. Highway 101 and the eastern portion of PCH are also operating at capacity. Mulholland Highway between Topanga Canyon Boulevard and Old Topanga Canyon Road is currently operating at LOS D. All other roads within the study area are

currently operating at an acceptable LOS.

A description of the major roadways within the study area is provided below, including a brief description of the roadway and the roadside environment, the existing traffic use, and the LOS provided under the current traffic conditions.

► (U.S.) Highway 101

Highway 101 traverses the full length of the state of California and is a major arterial that carries local and regional traffic. Highway 101 within the study area travels through the San Fernando Valley between the Santa Monica Mountains and the Santa Susana Mountains. Highway 101 is a divided, eight-lane limited access highway, with an interstate design including interchanges and on- and off-ramps. This highway is used heavily by commuters and local and regional truck traffic traveling in and out of Los Angeles. The ADT volume on Highway 101 within the study area varies

between 119,000 and 294,600 vehicles per day (VPD). This highway operates at or near capacity (LOS E) during the weekday morning and evening peak travel periods. During the off-peak periods the highway operates at LOS C/D, providing moderate to poor service.

► **Pacific Coast Highway (State Route 1)**

Pacific Coast Highway is located between the SMMNRA and the Pacific Ocean. PCH was constructed in the 1920s and is the only coastal arterial along this section of coastline. PCH is situated immediately behind the beaches and beach front properties, and is generally at an elevation between five and fifty feet above mean sea level. This section of PCH is included in the *Master Plan of State Highways Eligible for Official Scenic Highway Designation*. PCH is also part of the state-designated bicycle route extending from the Oregon border to Mexico.

Most of PCH adjacent to the SMMNRA, including the portion through Malibu, is a four-lane facility with left turn pockets. The treatment of the center median varies from flush painted islands to raised islands with concrete curbs. The eastern portion of PCH near Santa Monica consists of six travel lanes with a center turn lane, while the portion at the west end of the study area near Point Mugu consists of three travel lanes. In the area where there are three lanes, the third travel lane is used as an additional travel lane that alternates between eastbound and westbound directions. The posted speed limit on PCH varies between 45 and 50 mph.

The roadside environment along PCH is diverse. On-street parking is permitted on both sides of the road in most areas. The ocean side of the road is lined with driveways that access private properties and beachfront commercial establishments. Numerous public parking lots for beach

patrons gain access directly from PCH. The land side of the road is lined with commercial establishments in many areas, especially from Malibu east. Steep hillsides border the land side of PCH in many areas, and is unsuitable for development due to the steep grade.

All of the routes that lead into the mountains to the north connect to PCH. All of the major junctions are controlled with traffic signals. There are approximately 24 signalized intersections along PCH within the study area. The side roads at the minor intersections are controlled with stop signs. Designated pedestrian crossings are provided at most signalized intersections. At least one traffic signal near the pier in Malibu is present for the express purpose of providing for pedestrian traffic crossing PCH.

The ADT volume on PCH varies widely. Daily volumes range between 10,800 in the west to 68,700 in the east. PCH east of Kanan Dume Road is used as a major commuter route connecting Los Angeles and the surrounding communities. Traffic on PCH reaches well-defined peaks during the morning and evening commute hours. On average weekdays, between 6:00 a.m. and 9:00 a.m., and between 3:00 p.m. and 7:00 p.m., this corridor experiences heavy traffic with moderate congestion. Traffic congestion frequently occurs on PCH between Malibu and Santa Monica during the evening peak hours.

PCH is the sole access route to numerous state beaches and several county beaches and parks. It is estimated that the beaches along PCH receive more than 30 million visitors per year. On nice weekends, during the year and everyday during the summer, PCH experiences significant traffic generated by visitors to the beach and the SMMNRA. During these times, vehicles park along both



sides of the road, and pedestrian traffic along the road and crossing the road increases significantly. Both of these factors tend to reduce the performance of PCH, which results in high levels of traffic congestion. Access to the parking lots and business establishments becomes more difficult due to the bumper-to-bumper roadside parking and the traffic congestion. Traffic congestion is greatest in the areas in and around Malibu and near the public beaches. Traffic congestion is much less of a problem in the areas west of Zuma Beach. The relatively high traffic volumes and traffic congestion associated with peak use periods makes it difficult for visitors to find and access their planned destinations.

The worst traffic congestion is typically associated with traffic returning to the city at the end of the day, especially at the end of a weekend. In these cases, eastbound traffic backs up on PCH for miles as stop-and-go traffic moves towards Santa Monica and access points to Interstate 10.

► **Mulholland Highway**

Mulholland Highway was built during the 1920s and 1930s. It is a two-lane highway that traverses the crest of the Santa Monica Mountains, beginning at the Topanga Canyon Boulevard and intersecting with PCH near Sequit Point in the western portion of the SMMNRA. Mulholland is designated as a scenic corridor and provides excellent views of the SMMNRA and the surrounding area. Mulholland provides access to many of the visitor-use areas within the SMMNRA including the Backbone Trail, the Paramount Ranch, and several state parks. The Mulholland corridor is designated as a regional bicycle route within Los Angeles County.

Mulholland Highway has little or no paved shoulder area and only a few designated pullouts. Most of Mulholland

has a posted speed limit of 55 mph. Side roads are controlled by stop signs, giving the right-of-way to traffic on Mulholland.

Mulholland Drive is the eastern extension of Mulholland Highway. Mulholland Drive begins on the east side of Topanga Canyon Boulevard and extends east to its junction with the Hollywood Freeway (Highway 101). A six-mile-long section of Mulholland Drive between Topanga Canyon Boulevard and the San Diego Freeway is unpaved and closed to public vehicles. The remaining section of Mulholland Drive is similar in character to Mulholland Highway.

Traffic volumes on Mulholland Highway vary between a high of 7,400 ADT at the eastern end near Topanga Canyon Boulevard to 2,800 ADT near Malibu Canyon Road. The lowest volumes on Mulholland Highway are found west of Malibu Canyon Road where traffic volumes are generally less than 500 ADT. For the most part, Mulholland Highway is not used as a commuter route, although it is the home-to-work route for some of the residents that live within the SMMNRA. There is no evidence of any significant traffic congestion on Mulholland at this time. Visitors to the SMMNRA and the state parks, as well as the local property owners, generate most of the traffic on Mulholland.

The LOS analysis indicates that western portions of Mulholland Highway are operating at an acceptable LOS A/B. The road segment near Topanga Canyon Boulevard is currently operating at LOS D.

Field observations indicate that most motorists drive this route at or near the 55mph speed limit. This tends to make it difficult for new visitors to the corridor to experience the numerous scenic vistas, without creating a safety problem for themselves and other motorists. There is a noticeable lack of designated pullout areas along this scenic corridor.

► **Interstate 405 (San Diego Freeway)**

Interstate 405 runs north-south and cuts across the eastern end of the SMMNRA. It intersects Mulholland Drive at a grade-separated interchange where Mulholland passes over the interstate. I-405 carries large volumes of regional commuter traffic and is heavily used throughout the day, with significant traffic congestion occurring during the peak commuter hours. I-405 is a multi-lane divided highway that carries 357,100 vehicles per day.

► **Topanga Canyon Boulevard (State Route 27)**

Topanga Canyon Boulevard is a two-lane roadway that crosses over the Santa Monica Mountains in the eastern portion of the SMMNRA. The road connects PCH with Highway 101. This road is used as a major commuter route through the SMMNRA, and experiences relatively high speed and high volume traffic during peak commuter hours. The commuter-generated traffic congestion is worst during the morning peak hours.

The road provides for recreational access to Topanga State Park, the Backbone Trail, and the beaches along PCH. Traffic volumes on Topanga Canyon Boulevard vary between 13,400 and 14,200 ADT. The Topanga Canyon Boulevard is currently operating at LOS E.

► **Malibu Canyon Road/Las Virgenes Road**

Malibu Canyon Road is a major north-south commuter route through the SMMNRA. The road begins at PCH in Malibu and ends at Highway 101 near the community of Calabasas. The majority of the road passes through undeveloped land controlled by the SMMNRA or Malibu Creek State Park. North of Mulholland Highway the road name changes to Las Virgenes Road. Near the northern terminus of the route, Las Virgenes Road passes through a developing residential area.

The Malibu Canyon/Las Virgenes corridor consists of a two-lane roadway with steep grades and numerous curve sections. The road is not equipped with any auxiliary climbing lanes. There is one 1,000-foot-long passing lane located about one-half way over the mountains. There are few intersections along this route. The major intersections are controlled by traffic signals. These intersections include the junctions with PCH, Piuma Road, Mulholland Highway, Lost Hills Road, Meadow Creek Road, Agoura Road, and the ramps at Highway 101. The posted speed limit for Malibu Canyon Road is 50 mph. The speed limit is reduced from 50 mph to 45 mph between Meadow Creek Road and Highway 101 at the northern end of Las Virgenes Road. The road is equipped with roadway lighting and reflectorized raised pavement markers.

This corridor carries heavy volumes of commuter traffic with well-defined morning and afternoon peak hours. The Malibu Canyon corridor carries the largest volume of cross-mountain traffic of the four north-south connectors within the SMMNRA, with an average daily traffic volume of 22,800 vehicles. With current volumes, the corridors are providing LOS F during the peak travel hours of the day.

► **Kanan Dume Road**

The Kanan Dume Road begins at PCH, crosses the mountains, and connects to Highway 101 near Agoura Hills. Kanan Dume Road provides access to Mulholland Highway, the visitor-use areas at Rocky Oaks, the Zuma/Trancas Canyons, and the beaches along the coast. The road is a two-lane facility, with separate turn lanes at all major intersections. It is also equipped with streetlights and raised pavement markers. The road has several steep grades where additional climbing lanes have been provided. The most significant grade is three miles long



with an eight-percent grade. This particular grade is near the south end of the road on the approach to PCH and is equipped with an emergency truck run-out lane. There are three tunnels located on the Kanan Dume Road. The pavement widens at these tunnels to accommodate two southbound lanes and a single northbound lane. The southern portion of this road has a truck restriction limiting vehicles to 8,000 pounds or two axles.

The Kanan Dume Road is used as a commuter route. The road has a volume of 10,700 vehicles per day. Traffic is relatively heavy during morning and evening peak hours. Field observations indicate that most vehicles are traveling at or over the 50 mph posted speed limit. The Kanan Dume Road currently operates at LOS E.

► **Decker Road/Westlake Boulevard
(State Route 23)**

State Route 23 through the SMMNRA consists of three roads. The route begins at PCH on Decker Road, which leads up into the mountains. Decker Road intersects Mulholland Highway about four miles from the coast. Route 23 continues along Mulholland for about two miles until it intersects Westlake Boulevard. Route 23 continues on Westlake Boulevard until it intersects Highway 101 in Westlake Village. This corridor is very curvy, resulting in relatively slow vehicle speeds (35 mph). Commuters do not heavily use this route. The route provides access to the recreational areas located in the western portion of the SMMNRA. The corridor carries the least traffic of the four north-south connectors through the SMMNRA, with a daily traffic volume of 1,000 vehicles. State Route 23 is currently providing LOS A.

► **Minor Roads**

There are numerous minor roads that connect to the major routes mentioned

above. These minor roads are typically two-lane paved roads that lead to trailhead parking areas and provide access to private lands within the SMMNRA. These minor roads do not carry any notable amount of commuter traffic and usually carry relatively low volumes of recreational traffic. It is estimated that most of these minor roads carry less than 500 vehicles per day.

PUBLIC TRANSPORTATION

There is very little public transportation available within the SMMNRA. The Los Angeles County Metropolitan Transit Authority (L.A. Metro) provides transit bus service along Highway 101 as far west as Westlake and along PCH as far west as Trancas Canyon. These bus services make connections to other bus routes that access the greater Los Angeles area.

There is no form of direct fixed route bus service between the Highway 101 corridor and PCH. The only way to make the connection is to ride around the eastern end of the SMMNRA on L.A. Metro using several different lines to get from the Highway 101 corridor to the beaches. The only buses operating on the north-south route connections through the SMMNRA are the summer beach buses that operate between Zuma Beach and the communities of Calabasas and Agoura Hills. There is no bus service along Mulholland Highway.

Charter buses, carrying inter-city visitors, travel to the SMMNRA for day outings. These bus groups typically involve school children or the elderly on preplanned field trips to a particular area of the SMMNRA. The amount of charter bus activity is relatively low and occurs on a demand basis. Various community programs for inter-city residents usually sponsor these trips. The following public transportation services are available near the SMMNRA.

► **Highway 101 Commuter Express**

L.A. Metro operates a commuter express bus service along Highway 101 during weekday commuter hours. This service connects Westlake Village with Agoura Hills and Calabasas, and then travels on Highway 101 toward the city. This service consists of four to six buses traveling inbound in the morning, and a similar number of buses operating outbound during the evening commuter hours.

► **#161 Bus Line**

L.A. Metro operates the #161 bus along the same route as the 101 commuter express. This bus line operates between the hours of 6:00 a.m. and 6:00 p.m. Buses run about every 20 to 30 minutes on weekdays and every two hours on weekends.

► **#434 Bus Line**

The #434 bus line of the L. A. Metro system operates along PCH and goes as far west as Trancas Canyon. This bus runs every 20 to 30 minutes during weekdays and every two hours on weekends. The hours of operation are between 6:00 a.m. and 6:00 p.m. The #434 bus line provides the only public access to the beaches and the community of Malibu.

► **Summer Beach Buses**

Both the communities of Calabasas and Agoura Hills are operating seasonal beach buses that take riders to Zuma Beach. These beach buses operate only during the summer months. The Calabasas Beach Bus makes four round-trips between the city of Calabasas and Zuma Beach each weekday during the summer. The beach bus picks up riders in four locations and costs \$1.00 per round-trip.

The Agoura Hills Beach Bus is similar to the operation in Calabasas. It provides transit service between Agoura Hills and

Zuma Beach. The bus picks up riders at three locations within Agoura Hills. The bus operates on weekdays only during the summer and makes four round-trips per day. The cost is \$0.50 each way.

► **Pepperdine Van Pool**

Pepperdine University operates a vanpool between the university and the Calabasas and Agoura Hills area. This van pool service is available during the school year for students only.

PARKING FACILITIES

There are about 50 parking areas that serve the various beaches, trailheads and other visitor-use areas within the SMMNRA. The beaches along PCH have parking areas that hold 100 vehicles or more. Most of the trailhead parking areas are relatively small with capacities of less than 50 vehicles. The more popular parking areas are paved, while many of the more remote trailhead parking areas are not.

All of the beach parking areas experience parking demands that exceed the lot capacity during the summer months. During the off-seasons these lots are adequate in size for the parking demand. The majority of the other parking areas within the SMMNRA are of a size to accommodate the typical parking demand. Many of these parking areas are of a size and/or configuration that limits the size of the vehicles that can use them. In these instances, buses often have difficulty using these parking areas.

The one non-beach parking area that is not large enough to accommodate the typical demand is located at the end of Chesebro Road on the north side of Highway 101. This parking area is popular with bicyclists and hikers that use the adjacent trail system and often fills to capacity on weekends.



Public Services and Utilities

The following discussion summarizes the current setting of public services and utilities supporting the SMMNRA.

PUBLIC SAFETY

NPS Visitor Safety Services (VSS) provide service to all lands owned by NPS. The VSS also provides law enforcement and security for park structures. VSS works closely with several law enforcement entities, such as the Los Angeles and Ventura County Sheriff' departments, and maintains cooperative relationships with other administering agencies. A total of nine full-time staff is available.

The California State Parks provides public safety to recreation area visitors in eight state parks within the SMMNRA. A total of 24 permanent state park rangers and four permanent state park lifeguards patrol these areas on foot, bicycle, boat and vehicle. During peak operational months, there are 35 seasonal lifeguards providing aquatic safety to recreation area visitors using coastal state parks within the SMMNRA.

For lands and structures outside of the VSS and CSP jurisdiction, police protection services are provided through city and county governments.

The Los Angeles County Sheriff's Department provides police protection services to portions of the SMMNRA within unincorporated Los Angeles. The department is divided into 10 divisions (LA County web page). The Malibu/Lost Hills stations serve the west end of Los Angeles County, including the contract cities of Agoura Hills, Calabasas, Westlake Village, Malibu, and Hidden Hills, and the unincorporated communities of Topanga,

Chatsworth, West Hills, and the Santa Monica Mountains (LA County web page). The Malibu/Lost Hills Stations maintains approximately 150 to 200 sworn officers. Law enforcement activities focus primarily on traffic patrol.

Portions of the SMMNRA located within Ventura County are served by the Ventura County Sheriff's Department. The department is comprised of seven divisions. The department is headquartered in Ventura and maintains stations in Camarillo, Fillmore, Lockwood Valley, Moorpark, Ojai, and Thousand Oaks.

FIRE PROTECTION AND EMERGENCY RESPONSE

NPS VSS also provides fire suppression and emergency response service to all lands owned by NPS. Backup is provided by the Los Angeles and Ventura County fire departments.

The Los Angeles County Fire Department provides fire protection services to the SMMNRA as part of the larger consolidated Fire Protection District of Los Angeles. The department protects life and property by providing fire prevention, fire suppression, fire investigation, a hazardous materials response team, and rescue and related services. The Los Angeles County Fire Department operates out of 149 stations and employs approximately 94 chief officers, 620 captains, 1,750 firefighters and firefighter specialists, 800 paramedics, 30 foresters, and many other support personnel in various divisions (LA County web page). Fire stations are located in Agoura Hills, Westlake Village, and Calabasas. The district maintains the following resources that could be made available for fire protection: (1) 144 engine companies, (2) 5 helicopters, and (3)



FIRE ECOLOGY AND MANAGEMENT

THE SANTA MONICA MOUNTAINS National Recreation Area is unique among National Park Service units in that it is subject to excessive fire. Increasing population densities in the urban fringe have resulted in an increase in the number of fires and a decrease in fire rotation intervals. Although fire is a natural and important component of the ecosystem, unnaturally high fire frequencies are altering the native vegetation structure, facilitating invasion of non-native species and, in the worst case, converting native chaparral communities to non-native grasslands. Because prescribed burning for fuel reduction further increases fire frequency, vegetation management for hazard reduction is in conflict with sound ecological management. This problem is further complicated by the recent recognition by the scientific community that the current practice of rotational prescribed burning across the landscape is not effective in reducing the large extreme-weather fires that present the greatest hazard.

It is the policy of the Santa Monica Mountains National Recreation Area to manage natural areas in a manner that maintains and enhances ecological values while at the same time assuring public safety. The goal is to implement a fire management program that helps to maintain a fire regime that sustains natural biotic associations and ecosystem functions while providing effective and strategic defenses against wildfire.

The park's prescribed burning program would be revised to reflect an increased understanding of the potential ecological impacts of prescribed burning, a new understanding of extreme-weather fire behavior, and a recognition of the limited capacity of government agencies to implement prescribed burning. Similarly, wildfire response plans would be developed that provide for effective suppression while minimizing ecological impacts. To this end, ecological management zones would be defined and established where vegetation is managed for ecological values, and dynamic fuel management zones for hazard reduction at the wildland-urban interface.



numerous pieces of surface equipment. The California Department of Forestry and the U.S. Forest Service provide fire protection services for state and federal lands, respectively, within and adjacent to the SMMNRA. The district meets with representatives from each jurisdiction annually to address fire prevention and protection needs.

The Ventura County Fire Protection District serves the unincorporated regions of Ventura County, as well as other municipalities in the area. The city of Ventura has its own separate fire department staffed with paid firefighters at stations located throughout the city.

WATER

The Las Virgenes Municipal Water District (LVMWD) supplies potable and reclaimed water to portions of the SMMNRA, with the exception of the area east of Old Topanga Canyon Road. This area is served by the Los Angeles County Water Works District. Additionally, The Calleguas Municipal Water District serves the southern part of Ventura County. The LVMWD has traditionally purchased 100 percent of its potable water from the Metropolitan Water District of Southern California (MWD), and has recently worked toward blending groundwater pumped from the Westlake Village area with imported water supplies. Potable water is distributed to the LVMWD by two feeder



Wildfire in the Santa Monica Mountains (NPS photo).

lines operated by the MWD: West Valley Feeder No. 1 and West Valley Feeder No. 2. Both lines carry water from the State Water Project to water facilities in the central San Fernando Valley and the Calabasas/Western Los Angeles County areas.

Although development in the area can be found in varied topography, such as valleys and steep hillsides, the LVMWD has few problems and constraints with delivering adequate water and water pressure to these areas. In some of the more remote areas and high elevations, extension of water facilities is possible, but would be extremely costly.

WASTEWATER

Wastewater treatment services on the South Slope of the Santa Monica Mountains are provided by septic system within the lands owned by the three administering agencies. These septic systems provide sanitation in the southern half of the SMMNRA west of the City of Santa Monica.

County sanitation districts serve the remaining urbanized areas. The Los Angeles County Sanitation District provides 29 sanitation systems distributed throughout the county. The LVMWD is also responsible for wastewater treatment and disposal services in the area. Local feeders are maintained by the county's sanitation districts, and are connected to the LVMWD's main trunk lines. Wastewater is conveyed through LVMWD trunk lines to the Tapia Water Reclamation Facility (located within the SMMNRA boundaries) where the sewage receives tertiary treatment. The plant has sufficient capacity to accommodate projected growth until the year 2010.

SMMNRA lands within Ventura County are within two sanitation districts: the city of Thousand Oaks and Triunfo County Sanitary District. No community sewage treatment facilities exist within the Ventura County portion of the SMMNRA. The city of

Thousand Oaks operates the Hill Canyon Wastewater Treatment Plant. The plant has sufficient capacity to handle regional flows until the year 2010. Wastewater within the Triunfo County Sanitation District flows in the Tapia Wastewater Treatment Plant (*Ventura County General Plan*, 1988).

Although a majority of the study area is connected to sewers, septic systems serve most of the rural hillside areas. Previous development within the hillside areas has been largely scattered, thus requiring the use of septic systems as a practical matter. However, although many septic systems employ state-of-the-art technologies, numerous septic tank failures have been reported in older systems within the mountain areas. For some areas not served by sewers, assessment districts have been established and fees are being assessed to residents on septic systems for the ultimate connection into the LVMWD trunk lines.

WASTE MANAGEMENT

Solid waste management services can be provided to most of the SMMNRA by the Calabasas Landfill, among others. The Calabasas Landfill operates within the SMMNRA, and is located adjacent to the Ventura Freeway on Lost Hills Road near Agoura, California. The landfill currently operates as a non-hazardous municipal solid waste landfill and is operated by the Sanitation Districts of Los Angeles County. In operation since 1961, the landfill was established 17 years prior to the creation of the SMMNRA. The landfill is permitted to accept 3,500 tons of refuse per day and currently accepts an average of 1,200 tons of refuse per day.

ENERGY

Electricity and natural gas are the primary sources of energy used in the Santa Monica Mountains area. Southern California Edison



and the city of Los Angeles Department of Water and Power (LADWP) provide electricity to areas within the SMMNRA. The majority of electric transmission lines in the area are 66 kilovolt (kv) transmission lines and 16 kv distribution lines. The 16 kv lines are located underground and adjacent to major roadways. Both electric power providers currently maintain adequate capacity to service existing users and planned growth. Southern California Gas Company provides natural gas to this area (NPS 1999). Natural gas is also provided to the study area by subsidiaries, which oversee transmission mains and local distribution lines. Distribution lines extend throughout the study area to serve existing development (with the exception of hillside areas). To plan for future growth, additional natural gas facilities are planned for development. The existing and planned facilities are adequate to meet the area's natural gas demand.